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COMPUTER WEEKLY

Tour de force

THE fourth round of the European touring car championships, which attracted a big entry to the Brands Hatch circuit in Kent, was sponsored by Générale de Service Informatique UK, the British branch of the French-based GSI group.

Here, Tony Cavender (right), chief executive and managing director of the UK operation, hands the GSI trophy to the winning team of Pierre Dieu Donné, Jean Xhenceval and Raymond van Hove.

NEWS IN BRIEF

Japanese meet CSA

A DELEGATION from the Office Automation Group of the Japanese electronics industry has had discussions with the CSA on word processing, electronic mail, and teleconferencing, in order to exchange views on developments in the two countries.

The Japanese were apparently surprised at the systems approach to office automation taken in Europe, involving the whole organisation and the way in which information flows, unlike the Japanese approach that is concerned largely with equipment.

Traffic control

TRAFFIC conditions in Belfast will soon be monitored and controlled by an urban traffic system from Plessey Controls of Poole, Dorset. Placed by the Department of the Environment for Northern Ireland, the order is for the installation of 110 traffic signals, 25 Pelican pedestrian crossings, and 30 special detectors.

Future with micros

THE controversial report from Sussex University Science Policy Research Unit on the social impact of microelectronics, written by Iann Barron and Ray Curnow (CW, October 5, 1978) has now been published. Under the title of "The future with microelectronics," it is available as a 243 page book from Frances Pinter Ltd at £7.95.

Offices shut

THE Local Authorities Management Services and Computer Committee is to close four of its regional offices in order to concentrate more resources on research at a national level.

Pentagon picks European real time language

THE US Department of Defence has chosen the European design prepared by CII-Honeywell Bull for its future real time language Ada.

Widely known as the "green" language after the colour coding previously adopted to ensure anonymity, the Honeywell design has for some time been regarded as the better technical candidate. It was however questionable whether a European design would be found politically acceptable.

Although nominally contracted to the Honeywell Systems and Research Centre in Minneapolis, nearly all the development so far has been the responsibility of a CII-Honeywell Bull team working in Paris.

The DoD's choice therefore represents a considerable accolade for European expertise.

The decision, announced exactly on schedule on May 2, also scotches fears that the DoD project would defeat much of its purpose by spawning not one but two new standard languages.

Had the other remaining candidate, "red," been selected, the Honeywell design might well have been adopted unilaterally in Europe — if not as a complete alternative to Ada, then at least as the European Systems Language (ESL).

With the choice having fallen on green, work by the competing "red" contractor, the US software house Intermetrics, will now almost certainly cease.

Very considerable interest has focused on the successive stages in the definition of Ada, which was for a long time referred to as the Ironman language after the name of the penultimate requirements specification.

Despite being intended primarily for defence applications, it is likely to be very widely adopted for real time programming in general. In this, it will get a major boost from the DoD itself, which in its own interest intends to make compilers and other software "widely and cheaply available."

All of this, though, is still some way off. As the next stage of the project, the DoD has planned a series of workshops at which existing programs will be recoded in Ada as a test of the design.

The design will then be refined in the light of this experience, with the aim of producing a final language definition early in 1980.

Ada will at this point be added to the DoD list of approved languages.

A further lengthy delay will then be inevitable while working compilers are developed. Honeywell itself has so far only developed a prototype interpreter for Ada, admitted by all who have looked at it to be a large language.

Further work also remains to be done on the specification and development of standard programming and support tools for which the DoD has issued a parallel series of requirement documents under the successive names Sandman and Pebbleman.

Times keyboarding proposal

PROSPECTS for a settlement at The Times have improved following a compromise proposal by management that represents a substantial climbdown over its former position on the operation of new computer equipment.

Discussions are now going on over management's offer to have all text input done by National Graphical Association members, so long as the NGA agrees to journalists doing subediting directly on terminals.

This arrangement would probably be for a fixed trial period of 2½ years, after which the situation would be reviewed by both sides. Although the NGA has been adamant that no one but its members should be allowed to touch keyboards, it may well agree to a deal such as this if only because the computer system could not be operated practically if subeditors had no access to screens.

These suggestions leave unsolved the problem of keyboarding by advertising staff, who are not journalists but members of another print union, Natsopa. Negotiations between The Times and Natsopa over other issues such as disputes procedures and manning levels are still causing difficulties.

A deal with the NGA along the lines proposed may well lead to serious difficulties in implementation, by making operations inflexible and by introducing uncertainty over which journalists are sub-editors and which are not.

Production of the weekly European edition of The Times was abandoned after the printing of a few thousand copies, owing to violence by pickets outside the printing plant in Frankfurt and threats of further violence. There will be no European edition this week, but publication may be resumed if management succeeds in its efforts to find another printer.

The picketed printer, TER Druckerei, is a non-union shop but nonetheless the West German print union, IG Druck, had organised between 200 and 300 pickets who were joined, according to police, by a good number of political activists.

The Hessen Newspaper Publishers' Federation is prosecuting three union officials for trespass and uttering threats and menaces, and other "persons unknown" for attempted arson and damage to property.

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SRC offers Cray 1 service

SCIENTISTS in the UK are to have access to a Cray 1 supercomputer installed by the Science Research Council's Daresbury Laboratory in Cheshire.

The Cray 1, which is being rented from Cray Research, was originally installed at the European Centre for Medium Range Weather Forecasting at Shinfield Park, Reading, where it was replaced by another Cray 1.

The SRC says that it is making bureau services available to scientists on the ICL Distributed Array Processor being installed at Queen Mary College in London.

Application areas for the supercomputers include astrophysics, molecular, plasma and solid state physics and protein crystallography.

PO dispute

UNION action within Post Office computer centres (CW, May 3), has continued to effect despite a new pay offer made last week. It would have given an increase of 9% across the board plus a restructuring of the payscales which itself would have added another 5½% to some salaries. This was rejected and despite a later threat of suspensions by the corporation, centres at Leeds and Harmondsworth remain strike-bound. At Harmondsworth, union volunteers are operating an internal payroll system but the Lacés air-cargo system at Heathrow remains dormant.

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COMPUTER WEEKLY

Number 653 Thursday, May 17, 1979 Price 18p

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NEW Josephson Junction microcircuits developed by IBM, operate three times faster than those hitherto announced, by use of a technique called current injection logic, which uses injected currents as well as magnetic fields to switch the circuit.

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Calcomp sells out

HAVING sold most of its disc drive manufacturing interests to the Diablo subsidiary of Xerox, the rest of plotter specialist Calcomp is being bought by Saunders Associates in a $45.9 million takeover. Calcomp has connections with two European companies: in the UK, SPL is writing graphics software for the IGS 500 terminal under an Insac contract, and SEMS of France is supplying Calcomp with Solar 16 minis for use in graphics terminals.

Danes help

THE Danish government has joined the queue of companies and institutions anxious to ensure that local computer manufacturer Regnecentralen remains in business (CW, May 10). The government is determined that the company remain in Danish hands, and is considering additional orders for Regnecentralen and financing joint development projects.

999 speed-up

TO speed up response times to 999 calls, the Metropolitan Police is installing a command and control system called Computer Aided Despatcher which will cover the whole Metropolitan area by the mid 1980s.

Cobol contract

INTEL has confirmed the contract with Micro Focus for the latter's CIS Cobol compiler, which will be marketed worldwide by Intel as part of a new Vendor Supplied Product Programme (CW, May 3).

Fujitsu models

THE low end of Fujitsu's line of M-series mainframes has been recast to meet competition from IBM's 4300 series. New M-130, 140, 150 and 180 F-series models have been announced, with 64K memory chips. The 140F is claimed to be 1.6 times the power of the 4331 at the same price, and the 180F to be 1.1 times as powerful as the 4341 at 75% of the price.

Datek deal

THE UK phototypesetting equipment manufacturer, Datek Systems of Wembley, has signed an agreement with Linotype-Paul under which the latter will sell the Datek 7000 series on a worldwide basis.

Ambassador at Compec

The British Ambassador to Belgium, Sir Peter Wakefield, visited the Computer Weekly stand at last week's Compec Europe exhibition, held at the Centre International Rogier in Brussels, attracting more than 8,200 visitors — an increase of over 10% on the 1978 attendance.

Sir Peter (left) is seen here discussing Computer Weekly, Europe's most widely read computer newspaper, with Chris Hipwell, editorial director (centre) and Chris O'Hea, assistant advertisement manager.

● Report and more pictures — Pages 16/17.

Thatcher axe over NEB firms

TORY plans to restrict the operations of the National Enterprise Board were confirmed in the Queen's Speech and measures to amend the 1975 Industry Act, under which the NEB was set up, will be among the early legislation to be considered by the new Parliament. Until this is resolved the future of computer-related projects such as Insac, Inmos and Nexos will be under a shadow of uncertainty.

NEB chairman Sir Leslie Murphy and Industry Secretary Sir Keith Joseph, have already started talks on the future of the NEB and these are expected to continue into the autumn.

If the board has to sell off all its computer interests, the prospects of Inmos finding alternative backers seem the least hopeful, while Insac, the international software marketing consortium, could be acquired by an as yet unnamed organisation believed to be interested in buying the company intact (CW, May 10).

Insac members are less worried about the prospect of the NEB selling off its shares in them than they are by the possibility of Insac itself being wound down. A spokesman for Systems Designers said that the demise of Insac would be "terribly sad" because of the need

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Insac going well in US

INSAC's efforts to sell viewdata systems in the US are going well. Letters of intent for 60 ports have been received from US firms, mainly tour operators and banks. Home banking, whereby the general public can dial their banks and transact business from their sitting rooms, is causing great interest.

An agreement between Insac and a large US company over marketing viewdata there is expected soon. The US company will probably be GTE (CW, January 25).

According to John Pearce, Insac managing director, several large US corporations are thinking of buying viewdata systems for closed user groups, for internal use. Pearce feels that the most money to be made at this early stage in viewdata's history is in closed user groups, not with the domestic market which the UK Post office has entered.

Opportunity for UK lead in Ada development

EMPHASISING that the UK aims to stay at the forefront of Ada technology, the Ministry of Defence has let a joint contract to Systems Designers and Software Sciences to study the implications of Ada for the software support environment.

Including integrated tools for program design, testing, and maintenance, this area has already been addressed in outline by the DoD's Pebbleman specification. US work in this field, though, appears to have taken second place to the race to define the language itself.

An opportunity may therefore exist for the UK to establish a lead, building in particular on experience with Mascot.

Although Mascot itself is unlikely to support Ada, the support it provides is seen as broadly similar to that called for by Pebbleman and it aims at exactly the same problems of software development and ownership.

Speaking about UK experience with Mascot as a standard, an SDL spokesman described it as an effective interim solution. Developments using Coral and Mascot were likely to continue till between 1985 and 1990, he said, with Ada coming into use from 1985/90 onwards.

● The next few weeks will present many opportunities for potential UK users to explore the implications of Ada. The UK is also participating in the DoD's programme to validate and refine the language. Details Software File, page 7.

INSIDE THIS WEEK'S CW.....

DATA COMMS FUTURE

Although the development and application of the micro has taken a big share of the limelight over the past months, data communications are likely to have as wide an impact as any other computer related development over the next five years. This week's special section reviews various aspects of data communications including the growth of viewdata. Pages 19/23

SOLID STATE SANTA

For the hard nosed business fraternity, Santa's next delivery will contain last year's developments, and many of the toys and gadgets will be micro driven. From New York we report on some of the latest devices. Page 26

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JOB VACANCIES: PAGES 28-63

Univac likely to be first with bit-slice mainframes

HAVING revolutionised the minicomputer world, the bit-slice microprocessor is about to do the same for mainframes, and the first company to introduce a high performance bit-slice mainframe is likely to be Univac.

The company is ready with a replacement for the 1100/40, 1108 and 1106, offering performance of over one million instructions per second based on the Motorola 10800 4-bit bit-slice microprocessor. The performance is achieved by having more than one full 36-bit processor running in parallel in each CPU.

The 10800 is a member of Motorola's MECL-10K emitter-coupled logic family, and is claimed to be capable of executing a 16-bit "add" execution in 41 nanoseconds.

Its adoption by Univac for the 1100/60 marks a number of firsts. It is believed to be the first time that a mainframe manufacturer has used bit-slice technology in a machine of this power, the only other bit-slice mainframe being the small and comparatively low-power Digital Equipment DECsystem-2020.

It is also believed to be the first bit-slice emulation of a 36-bit word machine to be offered on the commercial market. Several companies, including Two Pi and National Semiconductor, do bit-slice emulations of the 32-bit IBM 370 line, but these machines are designed more for low cost than high performance.

The CPU on the 1100/60 uses nine of the four-bit 10800s to get the 36-bit word width; the machine addresses a maximum of two Megawords, equivalent to nine Megabytes.

It will also be fitted with an 8K word cache; previously only the 1100/80 has had cache memory, and marked the switch at Univac from main and ex-

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Fairchild and Gould go to court

SINCE Fairchild's rejection of a takeover bid by Gould (CW, May 10), both companies have become involved in litigation. Gould has filed a suit in Chicago alleging violation of federal securities laws in Fairchild's public conduct and statements.

Fairchild has filed a suit in New York alleging that the combination of Fairchild and Gould would violate federal anti-trust laws, and that Gould violated the disclosure provisions of federal securities laws.

First quarter earnings for Fairchild were up 23% to $7,056,000 over the corresponding period last year, while earnings per share jumped 20%.

£400,000 order

HONEYWELL has been awarded a £400,000 contract for a 8080 mainframe to replace two Elliott 4130s at University College, Aberystwyth.

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COMPUTERVIEW

The dinosaurs will be with us for a while yet

NOBODY knows why the dinosaurs died. But die out they did. The fact that some of the larger species appear to have had a secondary "brain" at the other end of their spinal column suggests that their peripheral handling capabilities were not all they should have been. But the fact remains that the evolution of the dinosaur was ended by a discontinuity, the nature of which has never been satisfactorily explained.

Little as we know about this phenomenon, it is reasonable to suppose that an inability to respond to the challenge posed by a significant environmental change — whether in terms of climate, or food supply or some other factor — was, in the absence of man, the root cause of their extinction.

It is, of course, always possible to push analogies too far, but the news that IBM's General Systems Division has opened a computer store in Rotterdam, (CW, May 3) having already opened 48 retail stores in the US, suggests that some fairly far-reaching changes are occurring in the computer world.

Whether one regards mainframe systems as the dinosaurs of the computer world and machines such as the IBM 5110, which will be sold in the new computer store, as precursors of the warm-blooded mammals which will replace them is, to say the least, debatable.

However, one only has to consider a mainframe system which has been in operation for a few years, to realise how unwieldy and unresponsive the monster is: I write as a frustrated user.

The machine, in its air-conditioned enclosure, has to function in accordance with an ever-changing and ever-growing operating system which constitutes a significant overhead in terms of the computer's overall performance.

To enable the central processor to get on with a bit of productive work now and again, the really sophisticated installations — particularly those which service networks of terminals — may have a front-end processor, and there are even back-end processors and specialised database processors, the function of which is to relieve the load on the system's increasingly overburdened brain.

The needs of this monster are catered for by customer engineers, computer operators and programmers and a proportion of the latter will be engaged in maintaining existing software, to ensure that the whole thing does not come to a grinding halt.

Of course, these unwieldy and unresponsive systems will not disappear overnight. Unlike the dinosaur, they represent a significant investment in terms of hardware, software and training, and their continued existence is therefore guaranteed — for a time at least.

The question posed by the minicomputer, the microcomputer and the host of new systems which are cheap enough to be dedicated to specific applications rather than used as a general purpose computing system, is how long that time will be.

One can only conclude that mainframes will continue to exist as number crunchers, at the heart of computer networks and so on, but that the overall customer base of mainframe installations will gradually be eroded as more responsive, easily-used systems become available to the man-in-the-street or, at least, the businessman-in-the-street.

At the same time the microprocessor will enable computing facilities to be incorporated easily and cheaply in other equipment so that computing power will become an accepted feature of everyday life in much the same way that electricity and the telephone are accepted today.

So the dinosaurs will be with us for a while yet. It would certainly not be in IBM's interest to make them obsolete overnight. Equally, IBM is nothing if not responsive to market forces and it has shown by its product announcements, by the restructuring of its divisions and such moves as the opening of computer stores, that it is not going to leave the small computer market to the Texas Instruments and Tandys of this world.

One thing is certain, computer technology being what it is: the new systems will be smaller, more approachable and more responsive to our immediate computing needs than the mainframe ever was.

So, roll on the evolution.

Communication wires tangled with the DP department

THERE is no surer way of getting up-the-creek, with or without a data paddle, than moving into the advance level world of database communications. Auditors have been known to resign assignments rather than undertake the communication trail leading into the depths of ill-defined system technology.

It would be far more practical if all such communication routes led straight back to the equipment supplier. All too often, communication disasters are the result of over-keen salesmen, promoting ambitious and non-proven systems.

Not so long ago, database and related communication systems were regarded as being the biggest non-event in computing. Time hasn't changed the views of many. The present State of the Art leaves much to be desired with only a marginal swing towards successful implementation. If the computing reputations of the major banks and State industries are any guide, much of the computing industry would have been better advised to stick to basic processing.

The banks have hardly enhanced their computing image with the troubled SWIFT project. Even the Bushy bird would hesitate to publicise this particular endeavour.

Just why the DP department allows itself to become tangled in the communication wires, is difficult to define. Often it follows prodding from senior company management, keen to keep pace with competitors. This enthusiasm, however, often wanes when the bills start piling up. In many cases, the DP team itself may have become restless and started seeking new challenges. If so, it would be far better for all concerned if this energy was channelled into the Computastars contest rather than into DP communications networks.

Sometimes, it is the DP management team which swallows the sales message that database communication systems are loaded with advantages for the organisation. Such mixing and matching of data, however, is often more relevant to the sportswear department of Moss Bros than to the average DP department.

Advantages are probably loaded against the DP installation. While it is true that the basic cost of terminals and assorted hardware is falling, the cost of getting this particular show on the road is fast escalating. DP talent and expertise in these areas are strictly limited and therefore expensive.

The prime beneficiaries in the communication stakes — apart from the computer equipment suppliers and the Post Office — could well be the course presenters. Speakers such as Dr Adrian Stokes, of Langton Information, and John McNulty, of Modular Technology, seem to be constantly online at conferences and courses.

"Succeeding With Database" was the subject of a recent BIS course, although whether success would have been more assured by attending the earlier Infotech sessions on "Relational Databases", and "Distributed Databases", presumably wasn't discussed.

More recently, the conference company, ISL, presented "Telecommunications today" and will shortly be getting back on the data waveband with a session on "communicating with ICL". But whether this theme is being tackled from the aspect of making contact with the right department at Putney, or features ICL's networking strategy, is not yet clear.

1984 and all that...

FIRST of several readers who sent in this example of the strange things people say in the media about computers, was Ken Carruthers of St Albans, who wins £5.

We made the acquaintance of a silicon chip, a rare sighting of the fabled creature. The chip was larger than one had expected, about the size of a small wardrobe. It had the job of printing postage stamps for Mauritius. Sir Keith stared at the chip, and the chip hummed and winked back at Sir Keith, but did not reveal how it intended to vote, or what it had done with the 50,000 Mauritian postage stamp printers it had no doubt replaced.

— *Simon Hoggart in the Guardian*

D. M. Fayers also wins £5 for this election quote:

The more computers they got, the longer it takes.

- James Callaghan on "Nationwide", BBC TV, asked about delay at the DHSS in implementing

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90 nanosecond static RAM

A JAPANESE company, Oki Electric Industry, has introduced a 16K bit static RAM that features an access time of 90 nanoseconds.

Called the MSM 2128, the part is organised as 2K by 8 bits, and is mounted in a 24-pin package. State-of-the-art 3 micron geometries are used. So far, only sample quantities of the part have been produced by Oki, and customer sampling is not expected to start until September. Full production is scheduled for the first quarter of 1980.

Computer Centre moves to Swansea

COMPUTER Centre, a company specialising in low cost memory expansion systems for microcomputer systems, has moved from Fleet in Hampshire to a new home in Swansea, South Wales.

It has also come out with a memory expansion kit for the Tandy TRS-80 system. The 16K-byte kit, with documentation, costs £60 plus VAT, which compares well with Tandy's price of £150.

Ten years ago...

COMPUTER WEEKLY **MAY 15, 1969**

MARCONI-Elliott Computer Systems was formed from Elliott Space and Weapon Automation and GEC-Elliott Automation ... *Paper tape* equipment group Kade International went public ... In France, the Communist-led CGT trade union was attempting to organise the 40,000 computer people in the Paris area ... A consortium to supply hardware and systems design for Concorde was formed by Digital Equipment, Kent Instruments and CAP ... A Data Surveillance Bill was introduced in the Commons by Conservative MP Kenneth Baker ... World Weather Watch *set up a meteorological* DP centre with two IBM 360/65s in Melbourne, which formed a global network with the Washington and Moscow centres ... At Rungis, near Paris, the first installation in a Siti-GE network, expected to link farm produce markets all over the EEC, was officially established.

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Muirhead link-up with NEB's Nexos

MUIRHEAD looks like soon joining Logica as the second associate of the National Enterprise Board's office technology venture, Nexos, according to remarks made last week by the NEB chairman, Sir Leslie Murphy.

Sir Leslie told Computer Weekly that negotiations with a second, though unnamed, firm to join Nexos were nearing completion.

However, Muirhead and Nexos have confirmed that negotiations between the NEB and Muirhead are proceeding and Muir Moffat, managing director of Nexos, said that he hoped an agreement would be signed soon.

A Muirhead spokesman pointed out that if a deal were made with the NEB it would involve Muirhead and the NEB each taking a share in a new office equipment enterprise, rather than the NEB taking a share in Muirhead.

The deal would involve the fascimile transmission equipment side of Muirhead's business, and would not affect the rest of Muirhead operations, which include precision mechanical engineering.

In its deal with Logica (CW, February 1) the NEB took a 20% share in the systems and software house, following which Logica set up a word processing subsidiary, Logica VTS, which is now working with Nexos on the development of an integrated office system.

Rumours that Muirhead and the NEB would get together have been circulating for some time, but were given considerably more substance when Muirhead was invited to appear on the NEB stand at the Hanover Fair (CW, March 29).

Muirhead fascimile equipment on the NEB stand was successfully interfaced with Logica's *VTS 100* stand-alone word processor. Text generated by the VTS 100 was output in digital facsimile form.

Big rejig of CMG's management announced

DEVELOPMENTS in the management structure of CMG, Computer Management Group, have been announced. The plans include the appointment of 24 new directors throughout the group, the establishment of an Anglo-Dutch group management function and concentration of operational subsidiaries into specialist areas.

A joint Anglo-Dutch CMG group head office based in the UK and in Holland has been established together with the appointment of Nick Schofield and Cor Stutterheim. They were respectively national general managers of the UK and Holland and now become jointly responsible for CMG management worldwide.

Subsidiary companies in Holland have been reorganised and there are now four companies instead of three. CMG Rotterdam BV is to cover the South, and specialises in software support for computer manufacturers, while CMG Amsterdam BV covers the North and deals with motor dealer systems. CMG Amstelveen BV will concentrate on banking and CMG Den Haag BV, based in The Hague, will specialise in government and insurance.

In the UK, Chris Harrison has been appointed national director of CMG UK, with responsibility for data processing sales and marketing. He was formerly with CMG Southern.

Second-hand DP sale

AT 9 o'clock this Saturday, May 19, the doors of Electronics Hobbies will open on a seven day sale of second-hand electronics and computer equipment. Located at 31 Pancras Road, London NW1, Electronic Hobbies is offering a £3,000 computer marked down to £25 among the goodies.

Be prepared to go early however. Last year's sale had 200 people queueing the night before the opening.

Pet featured in RTL/2 development system

A LOW-COST RTL/2 program development system, incorporating the Commodore Pet, could be the first fruit of an evaluation initiated by microcomputer specialist Isherwood Computer Systems. The company is also considering implementing an RTL/2 compiler in ROM from the Pet.

Vital to both projects is the portable RTL/2 compiler being developed by SPL for use on microprocessors generally (CW, September 14, 1978).

SPL is understood to have completed work on the compiler front end and has been commissioned by Isherwoods to investigate putting it on the Pet. In theory all that should be needed is an interpreter specially written for the Pet, which would execute the intermediate code output by the front end.

However the limited memory of the Pet could seriously restrict its usefulness as a compilation system. To get round the problem, one solution being considered by Isherwoods is to back end the Pet with a Z80-based Horizon microcomputer.

A single Horizon, it thinks, could back end up to three Pets, with compilation and execution handled on the Horizon and such tasks as editing handled by the Pets. Prices could start at about £3,000 for a system including a Horizon and one Pet workstation.

In the long term, Isherwoods is thinking about implementing RTL/2 in ROM on the Pet, providing an additional or alternative board to the existing Basic interpreter. A stand-alone system of this type would be likely to cost about £1,200.

In either case, the standard interfaces provided on the Pet would allow it to be connected to a variety of more powerful host computers, such as PDP-11 running live applications, as well as directly to control equipment itself.

'Euronet will take on role of a secondary service'

AS national packet networks in Europe become directly interconnected, Euronet will take on the role of a secondary service. This view is put forward in the first Eurodata Foundation Yearbook*, published last week.

The yearbook covers current services and developments, as opposed to the Blue Book, published last year, which dealt with PTT plans, and the Eurodata Studies which assess future markets and user expectations. The structure of the PTT in 18 countries are dealt with in detail, with descriptions of their procedures and services. There are also notes on people to contact.

*Eurodata Foundation Yearbook 1979, £75, from the Eurodata Foundation, Lutyens House, 1-6 Finsbury Circus, London, EC2M 7LY. Price outside Europe $175.

Hoskyns for No 10 job

APPOINTED by Mrs Thatcher as head of her Policy Unit at 10 Downing Street is John Hoskyns (pictured above) founder of the software house which bears his name and lately an unpaid adviser to Conservative Central Office.

The Policy Unit's aim is to "develop the government's strategic policy in order to achieve its long-term objectives." It will liaise with the Think Tank (CPRS) and the Prime Minister's political staff. Members of the unit receive their salaries from the Civil Service Department.

Hoskyns sold the software group to Martin Marietta in 1975.

Itel AS customers set up user group

MORE members are now being sought for the Itel Computer Users Association which has just been set up by a group of eight Itel Advanced System customers. Membership is open to all UK users of the IBM compatible AS machines.

ICUA will provide former IBM users with an alternative to the IBM CUA, which decided earlier this year not to propose a change of its rules to allow users of IBM compatible machines to retain their membership if they no longer have an IBM CPU (CW, January 18).

The first chairman of ICUA is Donald Stott, data processing manager of the Manchester based Co-operative Insurance Society, the first UK user of the Hitachi-built Itel AS/6 (CW, March 1).

Stott pointed out that ICUA is completely independent of Itel and has no direct links with Choice, the group set up by Itel users in the US (CW, February 22).

One of the main purposes of ICUA is to communicate the collective views of members on technical and operational matters to Itel.

Other founding members of ICUA include British Aerospace which operates an Itel machine at Preston, and Unilever Computer Services, the biggest Itel customer in the UK.

The first meeting of the ICUA committee will be held at CIS in Manchester next week.

Itel users interested in joining ICUA should contact the association's secretary, David Hodgson, at Grandmet Information Processing Ltd, Wyvern Way, Rockingham Road, Uxbridge, Middlesex. Tel: Uxbridge (0895) 58111.

Franchises offered

COMPUTERLAND, which claims to be the largest network of microcomputer stores in the world, is offering franchises in Europe. Since opening its first European store in Brussels last December it has attracted 11 franchisees who plan to open stores in the autumn in London, Manchester, Paris, Stockholm and other major European cities — and it wants more. Details from Gordon Starr, president of Computerland Europe, on Luxembourg 43 29 05.

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Downtime

by Chad

With our resident German experts abroad (probably in Germany), I was flustered to receive the accompanying photograph and its caption — all six pages of it in that language. Clearly someone is taking the bull by the horns, and using an MDS Modal 40 to do something or other. The taxi yields one or two phrases at which I can guess the meaning — "spermaproduktion" and "töchter das Prüfbullen", suggesting something to do with artificial insemination. I think I'll ship more searching seminic probing: beware of the Proofbull . . .

Thanks a million (give or take a zero)

ELECTION night quote from David Dimbleby, after the BBC had lost the Tories a safe seat by omitting a digit from their vote: "Your can thank the computer for that."

Of course, it's *possible* that he meant, "You can-thank the computer for pointing out the mistake," but somehow I doubt it.

Incidentally, Logica staff at Television Centre on the night were bemused that everyone had started calling the PDP-11/35 "Rover". Rover was only one of a series of animals they produced to show off their clever graphics, but somehow the name stuck. Cardboard replicas were stuck up all over the place. (Replicas of the animal, that is.)

The programmers were awfully proud of their little trick which made the hands of Big Ben in one of the displays always point to the right time. Sadly, though, their cleverness was lost on the public: a lady reporter from the Mirror said, "Oh, I just assumed there was a TV camera pointing at a model clock." It's terrible the way nobody appreciates programmers, isn't it?

Uplifting quotes

HERE'S a new twist to all the "silicone chip" stories we keep seeing. Mr P. J. Morley sent me this cutting from the Sheffield Morning Telegraph:

> Silicon, once associated in the public mind solely with the artificial endowments of actresses, is beginning to impinge on everyday life: a slice of the stuff has a way with electrons that has allowed small scale computerisation on the cheap for an infinite number of tasks.
>
> Note the gentility of assuming that only actresses would have artificial endowments. Mind you, this may be connected with a story that appeared in the Birmingham Post about a microprocessor-controlled bra. (Honest!) I quote:
>
> Scientists at the Tenovus Research Institute, Cardiff, believe it could tell women the best time to make love and avoid pregnancy.
>
> If you are wondering what the data input would be, the story says it would come not from strain gauges but "tiny thermometers". For explanation of that, I will have to hand you over to our resident gynaecologist.

Buzzword...

I AM reliably informed that the name of the man who handles complaints for the Post Office in Hatfield is Mr Busby. Apparently he gets very embarrassed when irate callers insist on being told his name; they assume he is taking the Mickey and get even more irate.

So, you see, there are worse things than being called Shufflebottom. I knew someone called John Smith, who hated the knowing winks he would get from desk clerks whenever he checked into hotels with his (perfectly legal) wife.

Wang on the way to joining the billion-dollar club

THE declared intention of Wang is to be a $1,000 million concern by 1986, but the company now believes that it will reach that target a year or two early. In the year to last June, turnover rose 47.5% to $198 million, and orders taken since then are up 80% over the previous year.

The company has two main strings to its bow: word processors and new 2200 VS small mainframe, conceived to compete with whatever IBM introduced as the E-series.

"We started installing the VS in March last year, and in the 15 months in June this year, installations will reach 800, representing $60 million of business," says John Cunningham, executive vice-president at Wang.

"Almost all the US business with the VS has been with customers new to Wang; about 25% is coming from IBM System 3 and System 32 users, while 35 to 40% is coming from large IBM customers who want to decentralise. We are also winning business from first time users such as law firms."

One of the key features of the VS is a facility which enables Cobol programs to be written at a terminal, and this is proving an attraction with larger customers. The machine also has a 370-compatible instruction set (CW, June 22, 1978).

"Some software vendors are buying the VS in order to take advantage of the improved productivity offered by the screen Cobol, using it to write programs to run on IBM machines," comments Cunningham.

Developments on the way for the VS include SNA capability and an X25 communications interface; 2780 and 3780 communications emulation is available now. Wang already rates the VS as faster and more powerful than the new IBM 4341, and plans to extend the performance to three times that of the IBM offering, giving a power range likely to cover that of the full IBM E-series.

While Wang is doing well with the VS, the 2200 MVP and T processors are still the mainstay of its business, bringing in an estimated $220 million in the financial year to June.

Wang, whose executive vice-president John Cunningham (right) talked to Tim Pelmer about the company's strategy and achievements, has declared its intention of becoming a $1,000 million company by 1986. It is already well on the way.

But coming up very fast is the word processing business, which should reach $120 million this year and already accounts for 17,000 workstations installed.

The Datapro research organisation in 1978 identified Wang as the number one supplier of word-processing systems in the US, and the company's business has been doubling each year since it entered the market.

This year's Hanover Fair saw the European launch of the top-end shared logic word processing system, the OIS/100 line.

Launched in Europe at this year's Hanover Fair, the Wang OIS/100 line of shared logic word processing systems, an example of which is shown above, forms part of the company's strategy for the future.

"Design of workstations and the word-processors and the is converging, which will ma it easier to upgrade users fr one to the other," says Jo Cunningham. Word proces software is also being written the VS.

Two important new attra ments for the word proces were also launched at Hanov The Intelligent Image Printe a non-impact Xerograp printer which replaces t traditional laser with a hig resolution (90,000 dots p square inch) CRT displa Fibre-optic cables attached the front of this screen trans the characters to a Xerograp printing system.

The printer is controlled by Z80, and runs at the *equivale* of about 1,000 lpm. It cost $33,000, which is about half t price of the IBM off-line hig quality office printer.

The other new product is photo-typesetter designed f use with the Wang word pr cessors. Controlled by a mi with the Nova instruction se the Typesetter 48 translate word processing command from the terminals into typese ting commands, and comes fro Graphic Systems, a compa acquired by Wang.

It costs $22,000 in the US, a as well as running online to th word processors, is available a nn offline version with pape tape input. Up to 250 typeface are available, and hyphenati programs are available whic enable concurrent production several languages.

Wang has been manufac turing its own daisy-whee printer since November, sup plementing the ones it gets fro Diablo, and is also developing high density dot matrix printe which could eventually becom an OEM product.

Since an OIS/100 system ca have up to 33 micros, mai memory capacity can be enor mous: up to 1½ to 2 Megabyte distributed through the system Some 60% of those installed i the US have 2780/3780 IBM communications facilities in that IBM's new 3730 Distributed Office Communications System from the company's large com puter DP division holds no fear for Wang.

"In the US, IBM DP salesmen do not seem to understand the product — except in Cleveland," says John Cunningham.

"There they have a guy who really understands what shared logic word processing is about and that is the only place where we meet competition from the 3730."

Perhaps that stands as a warning to ICL, which, used the Hanover Fair as the launchpad for its new dual-station 7700 information processing system. Controlled by the same 16-bit processor used in the 7500 terminal systems, and backed with 40K-bytes of store, the 7700 is designed for use with a packaged cable Wang OIS/100 and runs on ICL mainframes.

Olivetti introduces rivals for Qyx electronic typewriter

OLIVETTI'S answer to Exxon's Qyx electronic typewriter, the ET201 and 221, have now been launched in Europe, ahead of the American machine.

Unlike the Qyx however (CW, April 6, 1978) the Olivetti machines are not part of an upwards-compatible range leading to true word processors.

The 221 has a single-line gas plasma display, showing the last 15 characters typed. Both models have two lines of buffer memory, and 1K characters of storage for standard phrases and forms. This storage is refreshed from a recharging battery which, the company claims, will last with the power turned off for six months.

Many of the usual typing features are available, such as proportional spacing, justification, and "lift-off" correcting ribbon; together with some unusual ones, for instance white-on-black printing. To do this, the machine prints a black rectangular blob with a special hammer and then makes the character in white on top of this with the correcting ribbon.

The printer is a daisy-wheel unit which Olivetti makes itself. The company is not, however, thinking of selling the printers OEM. Each daisy wheel has 100 petals, metalised, and various foreign-language characters are available.

The model 201 (no display) costs £1,075 and the 221 (with display) £1,275.

Keith Welkerden, the new managing director of British Olivetti, puts the ET221 through its paces, watched by some of the top secretaries, who were given a preview of the machine's capabilities.

Perkin-Elmer launches family of 32-bit machines

FACED with serious competition from the Digital Equipment VAX-11/780 and the IBM System 38, the computer systems division of Perkin-Elmer Data Systems has launched a new family of 32-bit machines, the 3200 series. They offer a considerable price/performance improvement over the company's existing 32-bit minicomputers.

The PEDS computer division, formerly Interdata, already derives most of its business from sales of 32-bit machines, and introduced the world's first 32-bit minicomputer in 1973.

But the general feeling in the company is that its two existing 32-bit products, the 7/32 and the 8/32 Megamini, were not promoted strongly enough at the time by Interdata.

Now, with the backing of Perkin-Elmer, a $600 million corporation, the 3200 series second generation of 32-bit machines are seen by the company as the means of putting it in the same league as Data General and Hewlett-Packard in terms of revenues.

A PEDS spokesman said that the 3200 launch was the most important product announcement in the company's history.

He added that IBM's move into the 32-bit transaction processing systems business with the System 38 was seen as beneficial by PEDS, because IBM had the resources to educate the vast potential market for such systems.

He pointed out that PEDS had no intention of competing with IBM for existing System 3 users because of the software conversion problems, but PEDS envisaged taking a lot of new customer sales from IBM.

The first machine in the 3200 series to be introduced, the 3220, is intended for scientific applications, but the second member, to be announced next month, will be a commercial machine and, according to PEDS, will be the most powerful 32-bit mini announced anywhere yet.

PEDS says that 3220 rivals the VAX-11/780 in Fortran applications, mainly because of the PEDS globally optimising Fortran VII, while costing considerably less. A 3200 with 256K bytes of main memory costs £23,115 in single units, and a one Megabyte 3220 is priced at £40,710.

All 3200 series machines will use 16-bit MOS memory chips instead of the core memory employed by the existing PEDS 32-bit computers. PEDS will charge about £6,000 for each 256K byte MOS memory module.

Opportunities in Asia

THE first in a series of market research reports on the potential of Asia as an import market is now available through IDC. It covers the Japanese semiconductor industry, and has been prepared in collaboration with SA Asia in Hong Kong, with which IDC is now working.

The two companies are currently formulating future research reports.

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German giant takes over Tally printers

MANNESMANN, the German engineering giant, has acquired 98% of the US based printer manufacturer, Tally, following takeover talks which started late last year (CW, November 30, 1978), and is now bidding for the remainder of the Tally stock.

The German company's existing printer manufacturing subsidiary, Mannesmann-Praezisionstechnik, based at Ulm in West Germany, will continue even if there is a Tally subsidiary in the same country.

In the UK, for example, Westrex will continue to sell standard Mannesmann printers, although Tally will sell non-standard Mannesmann products like airline ticket, bank passbook and air traffic control printers.

The combined Tally-Mannesmann organisation employs nearly 1,500 people and its turnover is currently running at £37 million.

National and Zilog agree

PRE-EMPTING the negotiations between Intel and Mostek on standardisation of 64K RAM designs (Micro News, March 22), National Semiconductor and Zilog have announced an agreement in principle covering the same product and some others.

The agreement covers a range of quasi-static, eight-bit wide memory devices of 16K bits, 32K bits and 64K bits. National will receive tooling and technical data from Zilog on its recently introduced Z6132 32K bit device, and the 16K bit memory will be a derivative of this.

The 64K chips, respectively the National NMC4864 and Zilog 6164, will have common characteristics.

Hoskyns reunion

THOSE who used to work for the Hoskyns group are invited to a reunion at the Crown Tavern, Clerkenwell Green, London EC2, next Thursday, May 24. Organiser is John Sharp, and anyone interested can get details from him on 01-778 5302.

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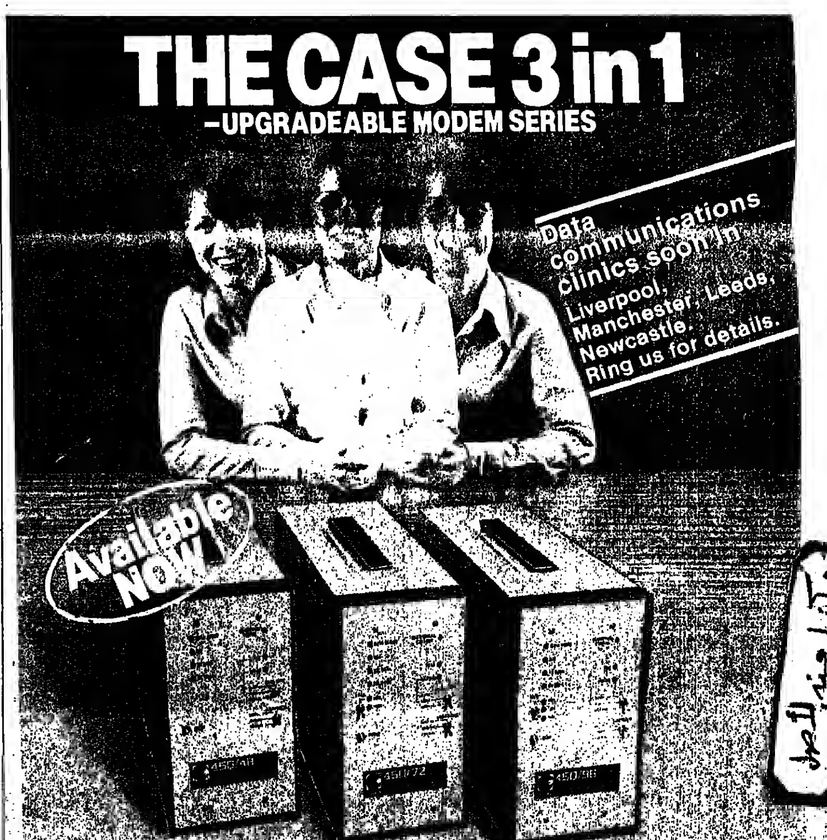

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MICHIE'S PRIVATEVIEW

Communicating with alien mentalities

SYMBOLIC communication between human and alien mentalities has some odd twists, even when we are merely considering communication between people and computers.

Computer users normally imagine that anything and everything which a computing system knows can be made part of the user's mental property. But the theory of complexity tells us that this is not the case. The user's mental grasp, restricted by known limitations to the brain's information-handling powers, may be too small. When the user is a senior US naval officer and the computing system is the entire Arpa net, this problem has acute importance. Wanted, therefore, a computational go-between.

The Rand Corp's program RITA, developed by Don Waterman at Santa Monica, has brilliantly filled this role. Dr Waterman will be presenting RITA to the AISB Summer School on Expert Systems, to be held at Edinburgh, July 11-13 (CW, May 3)[1].

A further point concerns machine representations which are strictly incommunicable with humans. Unfortunately most people, including computer scientists, imagine that there is nothing here which cannot be cured with a pinch of user-friendly interface software. If the representation has been engineered, through the desire to optimise machine resources, to lie outside the "human window," one might as well be trying to cure a wrongly designed engineering part with sticky tape!

Turn now to communication with dolphins. Analysis of the high band-width chit-chat exchanged among dolphins is being carried out with the aid of computer signal-processing techniques. The sponsor is again the US Navy, which trains these intelligent sea mammals for salvage and retrieval work on the ocean bed.

Visiting San Diego's Sea World recently, where dolphins and their killer-whale relatives outperform the tricks of all the trained seals, apes, dogs and horses that you ever saw, I spent an hour with the chief trainer.

The dolphin's brain is anatomically more impressive even than man's both in size and in surface convolution. So I was interested that he placed the dolphins as not substantially smarter than chimpanzees, with which he had had extensive previous experience. I sat in on a training session with a new killer whale. Rewards for successful tricks included food, pats on the head, and sometimes just permission to show off! "Showing off" took the form of prancing round the pool in an unbroken sequence of spectacular high leaps from the water.

What, then, is the huge brain mainly for? Partly, thought the trainer, in process the continuous stream of high channel-capacity sonar so that information about other dolphins and the surrounding world can be cross-correlated with the simultaneous flow of visual information. The Navy research workers in general agree with this.

Part, however, of the high-speed traffic of weird noises seems interpretable as expression of mood and general sociability. A dolphin can teach a complicated new trick to another dolphin. But what part is played by linguistic instruction, as opposed to demonstration and imitation, is not yet clear.

The acuity of dolphin sonar allows the animal to discriminate at a distance between metal spheres identical in all respects except that one is hollow at the centre. Time-resolution of the acoustic wave-form is of the order of micro-seconds.

I also observed that two dolphins can, as it were, mutually "lock on" their auto-pilots. Swimming at high speed in formation they transported to safety the relatively fragile form of a girl who had fallen into the pool. Carrying her between their flanks they were able to maintain a pressure which neither crushed her nor let her slip.

The main obstacle to man-dolphin communication surely lies in the disparity between the cognitive worlds of the two life forms. The fact that dolphins live in a marine world, remarks Professor Michael Arbib of the University of Mnssachusetts, "must greatly condition what intelligence they have. If indeed they do have language, the words they use will be different from ours. What may seem an obvious concept to them may be a very complicated concept to us."

Arbib's paper[2] centres mainly on problems of communications with inhabitants of other planetary systems. What sorts of messages should we send? Will the intelligences which we talk to be natural or artificial? Should we send pictures, and if so how will the recipients know which way up the pictures should be viewed? What are the linguistic and cognitive constants which might be expected to characterise all sufficiently intelligent beings, regardless of their perceptual and cultural milieus?

Arbib's cultivated romp through these topics is exciting reading. In a totally different way so is his recent text[3], written with Suad Alagić, on how to write structured and correct programs. A complaint is sometimes voiced that computer people have highly trained brains but illiterate minds.

It needs no more than a glance through the two works cited to show that, as with much else that is said about our profession, this too ain't necessarily so!

Donald Michie

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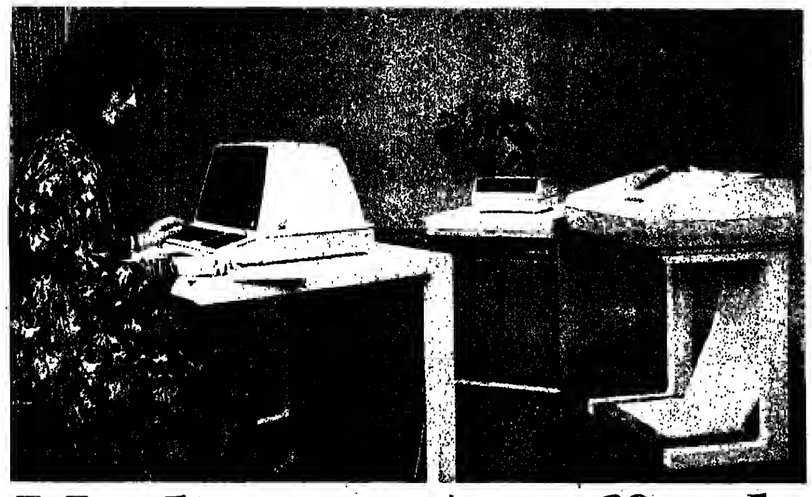

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SOFTWARE FILE

By Peter Hewitt

Pentagon opts for CII-HB Ada design

A FLURRY of UK activity focussed on Ada is getting under way now that the Pentagon has chosen the CII-Honeywell Bull design as the foundation for its future standard real time language (CW, May 10).

Over the next few weeks, there will be a host of opportunities for the public to learn about the language and explore its implications. The UK has also been invited to participate in the next stage of official work on the language, seen by some as the most important development project since Cobol.

Among presentations already announced are a seminar at the Institution of Electrical Engineers, a seminar arranged by the National Computing Centre, and a tutorial course at the National Physical Laboratory. Ada will also be discussed at the Royal Signals and Radar Establishment industry open day on June 14.

First of the events is the IEE's afternoon seminar on May 21, starting at 2:30. Intended as a review of real time languages for industrial applications, it will include an appreciation of RTL/2 by SPL's John Barnes, who designed the language while at ICI.

Also speaking are RSRE's Philip Wetherall who will discuss Coral 66 and Mascot, and Cliff Ringland, of Inmos, who will talk on languages for microprocessors. All will specifically consider the likely impact of Ada.

Two days later, on May 23, Barnes and Wetherall will again be speaking, this time at a one-day NCC seminar to be held at the Institute of Marine Engineers. They will be joined by David Shorter, of the British Steel Corp, and others from the Post Office and the Royal Military College of Science, Shrivenham.

Covering the selection of real time languages for control applications, the seminar will address questions including the suitability of Ada for industrial use, its size, and its availability on microprocessors.

The fee for the day is £92.34 for NCC members and £102.60 for others.

The NPL tutorial is designed for software specialists, and aims to give them a detailed knowledge of the new language. Starting on June 4 and lasting one week, it will be restricted to 20 participants, who must have working experience of Pascal and at least one other high level language.

The course has been arranged by Dr Brian Wichman of the NPL, who, with Barnes, was one of two UK language experts in the CII-Honeywell Bull team that designed the green language.

The UK is also taking part in the Pentagon's design test and evaluation exercise, aimed at validating and refining the language design. The Pentagon is holding five workshops, four of which will be in the US. The other is scheduled for July, at the RMCS, Shrivenham.

CII-Honeywell Bull has been asked to supervise the workshop and systems and software houses specialising in military work will be invited to attend.

Although some changes can still be expected in the language, one opportunity to study the current design will be provided by the June issue of the ACM's Sigplan Notices. This will contain the current language manual and reprints of this section will be available for sale to non-Sigplan subscribers. Three thousand copies of the manual are also to be published by the Pentagon.

● Computer Weekly last year published an assessment of the project and its likely impact, written by Dr Wichman (CW, June 29, 1978).

Breasting the summit

ECHOING the success of Telecomputing with TPS for the ICL 2903/4, a UK software house has won over 100 customers worldwide with a transaction processing system for the Honeywell Level 62.

Brought to light by the 100th sale, the software is called Equal and was developed by Mountain Software Growers, of Maidenhead. It gives Level 62 users an equivalent to Honeywell's TDS, which is only available on the Level 64 and above.

The software also runs on Level 64 and is being used on this hardware by three customers who have migrated from Level 62.

Equal is described by the firm as a dialogue management system and provides such things as an online screen format catalogue, automatic enquiry and update facilities, and sub-systems for data collection and program development.

Originally developed by Mountain Software Growers for a customer in Brussels, it has been marketed by the company for nearly two years; there are now users in eight European countries. In addition to the UK and Eire, and there are already 30 users in the US, where MSG set up a subsidiary last July.

Interestingly, the 100th customer was the East Lindsey District Council, which ordered a Level 62/49 to replace an existing 2903. Its system supports one local and four remote offices, and includes applications developed for the Council by MSG.

The development and support of Equal, however, is rapidly becoming the largest part of the firm's business, even to the extent of holding back the development of other products.

One of the most interesting of these is PDOL (Program Development Online), a terminal-oriented Cobol program generator. Originally developed for the Honeywell 2000 series, its implementation on current Honeywell systems has had to be deferred.

Stock Exchange is first UK user of Tone-3

A PRESTIGIOUS first UK customer in the form of the Stock Exchange has been found by the European Software Co for Tone-3, its implementation of TSO for VSI users.

The Stock Exchange runs VSI on both a 370/158 and a 3031. So programmers can use CMS for development work, it runs VSI under VM during the day on the 158.

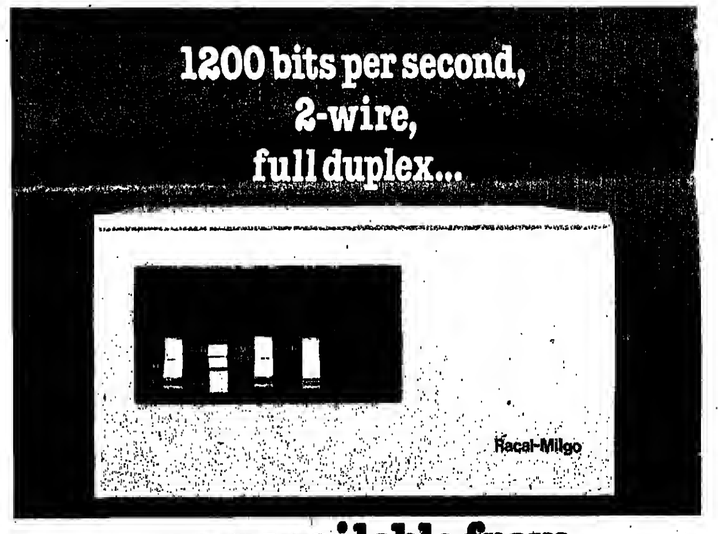
However with Talisman having gone live last month (CW, April 12), the processing workload is now at its peak and, to eliminate the VM overhead, both machines run VSI in native mode during the night.

The Stock Exchange therefore needed a tool which could take the place of CMS outside the prime shift, primarily for handling occasional jobs such as editing and job submission. After a short evaluation which also included [illegible] to install Tone-3.

One factor influencing the choice was the installation's long-term plan of converting to MVS and TSO. The command compatibility of Tone-3 with TSO meant that it could begin to accustomise its programmers to TSO immediately.

The Stock Exchange is currently renting Tone-3 and reports itself well pleased with the system, which took only one day to install.

When it eventually migrates to MVS, it may well consider the MVS version of Tone-3, Tone-4, which is claimed to offer significant performances over TSO while preserving full compatibility.



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PROGRAMMER NOTES

How much optimisation can we afford, given falling hardware costs?

CODE optimisation — saving a few hundred words here and a few milliseconds there — has been a high priority since the earliest days of programming. It has also given programmers much satisfaction, demanding ingenuity and a thorough understanding of the language being used.

There are, though, several good reasons why optimisation is likely to play a much less important role in the future. One of these — to use the ubiquitous current cliché — is the falling cost of hardware as opposed to the rising cost of developing and maintaining software.

This trend, it is argued, is replacing the question, "How much can we save by optimisation" with the question "How much optimisation can we afford?" The answer increasingly coming back is "not much."

Take, for example, the job of squeezing a program into memory. To save a few K, for example, with more complex table formats could well take several hours, as well as increasing the difficulty of subsequent program maintenance.

The cost of such work is beginning to compare very unfavourably with the cost of buying additional memory. The most commonly cited price here is IBM's US price of $15,000 per Megabyte on the new 4300 machines — equivalent to $15 per K.

To save 1K at this price, it is not economic to incur development and maintenance costs in excess of £7.50.

Further, the comparison assumes that only one program is involved. If others might in future require similar optimisation, the fact that the hardware purchase is a one-off expense makes the comparison even more dramatic.

The changing relationship between hardware and software costs thus has the potential to transform completely traditional attitudes to optimisation.

The fact that its frequent correlate — excessively clever and intricate coding — is also under attack from various directions, including the structured programming lobby, may lead it into a decline from which it will never recover.

Puzzler

DETERMINE the next number in the following series: 1, 110, 111, 100, 101, 11010, 11011 . . .

See page 63 for solution.

Lowndes-Ajax acquires right to Pac II system

METRA Lowndes-Ajax has acquired marketing rights to Pac II, the enhanced version of the project planning and control system Pac I. Claimed to be more comprehensive than any other system available, the software is written in Ansi Cobol and runs on most major mainframes.

Both Pac I and Pac II were developed by International Systems Inc in the US and are said to have more than 600 users worldwide. Although historically used chiefly in the control of DP projects, the systems are equally applicable to project managment in any field.

Pac II differs from Pac I chiefly in the integration of the planning function, Autoplan, which was previously a separate facility. It will be priced in this country at £12,500, with an optional report writer available for a further £1,250.

Metra Lowndes-Ajax, which was formed three years ago by Lowndes-Ajax Computer Services in conjunction with the French consultancy Metra, will also be supporting existing users of Pac I and II, which were previously sold by Computer Associates. These include Shell, Commercial Union and the Milk Marketing Board.

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THE computer consultancy firm, Amida Systems, has announced both a new range of packages and its move to new premises in St Albans. The modular application packages, written in RPG II, are available as either batch or online systems, and include stock control and sales forecasting. Amida's new address is Amida Systems, Waxhouse Gate, 15 High Street, St Albans, Herts. Tel: 0727 33137.

A SNOBOL 4 compiler has been made available by Equinox Computer Systems for its 16-bit time-sharing microcomputer. Known as Macro Spitbol, the compiler runs on a minimum 64K Equinox 300 system and can be used concurrently with Pascal, Lisp, Basic, and the macro assembler.

OP SPOT

By Bernard Allen

Meriel is a speedy operator

WHAT has a 19-year-old girl on a motor-bike got to do with Astral Computer Services? Answer — Meriel Reaser is the dispatch rider, delivering output to the bureau's customers around the City of London.

"I have been here for about three months but the work isn't new to me, I've done it before. It's my own bike although, of course, the company pays for all the petrol I use.

"I do three runs a day, on average, and they take me about four hours in all. I also help out in the job control section," she said.

She is soon to leave the bureau and "retake maths" at college so that she can qualify for a university place next October.

Small, friendly team that is happy in its work

O'Reilly

Wood

Custy

WHEN a chief operator, in the course of inviting me along to his installation, casually mentioned that his operators are a bit of a "mad crowd," and that the stationery storeroom is a bit of a "dungeon," I really did wonder if it was wise to accept the offer.

But accept I did. Although, as I set off for Astral Computer Services in the City of London, I half expected to end up as an entry on some sort of missing persons file.

On arriving at the site, however, I was pleased to find that the operators aren't a bunch of madmen who go around locking up people in their "dungeon."

Instead, they are a small and friendly team who spend their time running an IBM 370/115 under DOS/VS and Power/VS to provide a service to the bureau's users, many of whom are based in the City.

They work in teams of two on an eight-hour rota, giving 24-hour cover on all weekdays except Friday, when there is no night shift. And when I spoke to chief operator John O'Reilly it was obvious that a lot of thought had been put into planning the shift pattern.

"The operators work days on Monday and Tuesday; evenings on Wednesday, Thursday, Friday, Monday and Tuesday; and nights on Monday, Tuesday, Wednesday and Thursday.

"By splitting up the days and evenings in this manner, the operators only lose their social life for half a week at a time and so it's not so invonvenient for them. And the fact that they don't have to work nights on Fridays is also good."

In addition, they have tried moving staff between shifts in a number of ways, operations manager Graham Roberts explained:

"Firstly, we tried putting the operators on one rota and the shift leaders on another, so that everyone got to work with everyone else of a different grade. That wasn't too popular, so we stopped it.

"Then we put the shift leaders with each of the operators for nine weeks at a time. We stopped that because we found that some of them didn't get on as well as they might. It was good, though, because it gave the operators the chance to see how each of the shift leaders works.

"Anyway, now the teams work together on a permanent basis. It seems to work well and the staff are happy with it."

The machine configuration, which according to O'Reilly is more or less standard for an IBM 370/115, includes four 3420 tape units, a 1442 card reader, a 2501 card punch and four BASF 6240 disc drives (equivalent to the IBM 3340 drives).

Now the BASF disc drives are interesting because, according to shift leader Dave Wood, errors on the units are sometimes attributed to IBM kit by BASF engineers, and vice-versa.

Said Wood, "One evening I was unable to load the system and couldn't be sure whether the problem was caused by the BASF drives or the system itself.

"After discussing the matter with both engineers over the telephone, I finally called them in and said 'There you are, sort it out among yourselves.' I had enough of it and just wanted to get the machine up and running as soon as possible."

According to Wood, the two manufacturers now have an agreement under which, if one of them blames the other's equipment for errors, and is later proved to be wrong, it will cover the cost of any site visits resulting from the mistake by the other's engineers.

Astral plans to replace its current system with an IBM 4331 but Graham Roberts was unable to say when because "we are still waiting for the time when IBM will be able to give us a delivery date for the machine."

At present all of the bureau's input is via cards, but it plans to supplement and eventually replace the punch units with another system, such as key-to-disc or key-to-tape.

Also undergoing development is the magnetic tape library, which is being reorganised by librarian Tony Custy, a former operator.

He said, "Basically, I am reorganising the library so that the first three characters on the tape relate to the system it belongs to. I have already completed quite a few of the systems, but it's a complicated and lengthy business."

Manager who keeps in touch

IT'S good and rather unusual to hear a person at management level discuss the workings of the computer room as if he is really in touch with what's going on there.

So when Tony Lynch, general manager at Astral Computer Services, told me about some of the things the operators have to take into account on behalf of the customers, I was interested.

"We do some work for the Royal Society of Music — you know, producing the examination timetable, the examination results, and printing the pass certificates.

"Now, when producing the certificates, the operators have to be a bit careful because, quite naturally, the print quality has to be of a good standard.

"If it isn't up to scratch, the operators will change the printer ribbon. If that's no good, they will clean the print train, and if it still isn't up to standard, the IBM engineer is called in."

Lynch

AFTER five months as a trainee at Astral Computer Services, Paul Aplin has learnt a lot but still has a long way to go, and he is shown here studying a video-tape course in TP concepts by Deltatak Inc.

He said, "I've picked up quite a lot from the Deltatak courses and by reading the training notes written by our senior staff."

Paul was previously employed as a senior terminal operator by Unilever in Blackfriars, not far from his present installation.

"I left Unilever because I wanted to operate mainframe, rather than a terminal. To do that with Unilever would have meant relocating and I just couldn't afford it," he said.

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Sweet taste of success at Computastars

CHOCOLATE makers Rowntree-Mackintosh scooped most of the prizes in the North-eastern heat of Computastars on Sunday, held at the Princess Mary Playing Fields, Cleckheaton.

Teams from its Halifax computer centre tied for second and third places in the Ladies' team events with 141½ points and took first and second places in the Men's team events.

In the individual events, Andy Normandale was third with 38 points while in the Ladies section, K. Jones was joint first with C. Mitchell of PMSL on 49 points. Overall winners in the Ladies events was the Halifax-based PMSL team with 145½ points.

The weather usually dominates Computastars and on this occasion, brilliant sunshine was the order of the day. This enabled the competition to be run at a more leisurely pace.

Prizes were presented by Eddie Dalton, general manager of Wright Air Conditioning (Northern) which co-sponsored the event with Computer Weekly. The marshals were drawn from Spen Lions Club.

COMPUTASTARS NORTH-EASTERN HEAT

As Rowntree-Mackintosh were last year's winners, its teams automatically qualified. This means that fourth placed Midland Bank Operations takes a trip to Crystal Palace in September with PMSL.

RESULTS

Ladies teams — 1. PMSL, 145½ points; 2. Rowntree-Mackintosh II, 141½; 3. Rowntree-Mackintosh I, 141½; 4. Midland Bank Operations 133½.

Mens teams — 1. Rowntree-Mackintosh I, 186½; 2. Rowntree-Mackintosh II, 180; 3. Compower I, 173½.

Ladies individual events — 1. C. Mitchell, PMSL, 49; K. Jones, Rowntree-Mackintosh, 49; 3. P. Glenton, Midland Bank Operations, 43½; 4. Denise Allan, Empire Stores, 43.

Mens individual events — 1. Cook, Compower, 52; 2. Denver, Midland Bank Operations, 40; 3. Andy Normendale, Rowntree-Mackintosh I, 38.

TEAMS

Bradford, Bingley Building Society, Bradford; Compower, Sheffield; Datacall, Leeds; Digital Equipment Corp, Leeds; Empire Stores, Bradford; GEC Computers, Bradford; Link Computer Services, Harrogate.

Midland Bank (North Eastern), Sheffield; Midland Bank Operations, Sheffield; North-west Regional Health Authority, Harrogate; Platt Saco Lowell, Sheffield; RCA, Guisborough; Reckitt & Colman, Hull.

Rowntree-Mackintosh I, Rowntree-Mackintosh II, both Halifax; Yorkshire Regional Health Authority, Leeds; 600 Group, Leeds.

The PMSL Ladies' team receives the first prize from Eddie Dalton of Wright Air Conditioning (Northern) which co-sponsored the event with Computer Weekly.

ALL smiles (well nearly) from Rowntree-Mackintosh I, winners of the men's team events. The team (from left) of John Comdon, Andy Normendale, Peter Holt and Stewart Brannen receive their trophy from Eddie Dalton, one of the sponsors.

RIGHT: Andy Caban of Midland Bank Operations squat jumps against the clock under the watchful eye of a marshal from Spen Lions Club. His team finished fourth with 133½ points but still take the trip to Crystal Palace.

BELOW: GEC Computers' team takes the strain in the Men's tug-o-wer.

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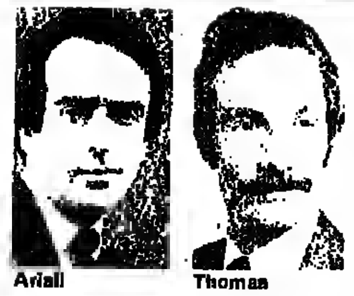
PEOPLE AND EVENTS

By Judith Morris


Arieli Thomas

Director of OPM UK

Moty Arieli has joined OPM Leasing Services as vice-president and senior operating officer for Europe. He has also been named as managing director of OPM Leasing Services UK, the company's British affiliate. Prior to this appointment, Arieli was director of finance for Europe of Itel International.

Nigel Doe, formerly a project manager for ICL, has joined CTL as commercial applications software services manager. He will have responsibility for providing a commercial applications software development service.

Trevor Constable, a former sales engineer at the Reading office of Pertec International, has been promoted to sales manager for the peripherals division of Pertec Computer Corporation, in California. Before joining Pertec, Constable was with RCA and IBM.

Richard Slogrove has joined Data Logic as a sales executive in its word processing division. He was previously a director of the International Office Planning Centre, and is a member of the Institute of Purchasing and Supply.

Richard Emery has been appointed sales and customer support engineer with Data Logic's terminal systems division. He joins the company from the John Lewis partnership where he was a senior systems analyst.

Expansion of new CAP company

CAP SCIENTIFIC, the company formed this year by the CAP-CPP group, has appointed three new members to its management team. The new staff will head groups which are involved in the company's activities in the scientific and defence fields.

The operational analysis group applies mathematical, statistical and operational research skills to improve decision making in investment, and to improve efficiency of systems operated by government and industry. **Godfrey Thomas** has been chosen as manager of this group. Like the other two new recruits he is a former employee of Scicon, where he held the position of divisional manager for the company's management science division.

John Chisholm has joined CAP Scientific as project controller, where he will have responsibility for project management. He was formerly a project manager with Scicon and supervised most of the defence work. He has also worked on a number of assessment studies for the Ministry of Defence.

Appointed to set up a Systems Engineering group for CAP Scientific, **Graeme Ferrero** came to computing from the engineering industry. At Scicon, he was a management consultant with the management science division, and supervised a team of mathematicians, engineers and scientists specialising in naval systems analysis. The Systems Engineering group which he is to manage is itself partially oriented towards naval technology but with a hardware bias.

Niall Shelloe and **Lyn Cox** have both transferred from the client support division of Package Programs, to the company's sales department. They will be responsible for selling the MMS range of financial systems. Their previous jobs have been taken by two new systems consultants, **Tony Stabbings** and **Kate O'Sullivan**. Stabbinga was previously an accountant with the London American International Corporation, and O'Sullivan was a computer audit and package implementation specialist with Deloitte Haskins and Sells. She originally trained as a teacher.

Roger Cooper has become manager of Hewlett-Packard's UK computer systems group. He was previously sales manager of the company's Western commercial district. He will take over from Derek Smorthit who has become Hewlett-Packard's first Scottish region sales manager.

Doe Hafferty

CASE appoints sales director

CASE has announced four new appointments, including that of **Michael Hafferty** to the post of sales director. He was previously sales manager for the firm, and before joining CASE was product manager for the Post Office's Datel services. Marketing manager is Grant Martin, a former product manager for the office communications sector. Until recently personnel and administration manager for Aquascutum, Eileen Murphy becomes personnel manager for CASE, and Arthur Cunningham development manager. He formerly worked for Computer Technology as manager of its complete design operation.

The appearance of Hewlett-Packard's marketing and sales headquarters, at Winnersh, has won the company one of this year's Racal awards for the environment. The awards are presented by Racal in conjunction with Berkshire County Council, and the judges remarked that obvious care had been taken to ensure that Hewlett-Packard's site blended well with the surrounding area. In our picture (left to right) Douglas Morrell, deputy managing director of Racal, David Baldwin, HP's managing director, David Reed, market development manager of Hewlett-Packard and Alan Wilson, business manager of HP.

BCS seminar

SOUTH YORKSHIRE branch of the BCS and the Sheffield Chamber of Commerce are organising a one-day seminar for small business computer users. The seminar, "How do I decide which small business computer is right for my company," will take place on June 13 at the Grosvenor House Hotel, Sheffield. Speakers will include Dennis Jarratt, editor of Which Computer, and Brian Richards, manager of advisory services at the NCC. Further details from J. Humbidge, Sheffield Chamber of Commerce, Earl Street, Sheffield.

Dave Ahmed and **Mike Sanders**, both previously with Data Recording, have joined X-Data. Formerly manager of customer repairs, Ahmed has become a product manager for disc systems, and Mike Sanders has been appointed depot manager. He was previously an engineer in test equipment services at Data Recording Heads.

Nick Gibson has become a junior systems analyst for the South-West branch of Redifon Computers. He was previously an actuarial student with Sun Life Assurance. **Ian Edwards** has been appointed branch manager for the Southern branch. He used to work for Burroughs as Leicester branch manager.

Chris Smith and **Harry Micklethwaite** have been elected respectively chairman and vice-chairman of the continuous stationery and form feed equipment division of the Business Equipment Trade Association. Smith is from Smith and Ouzman, and Micklethwaite from Roneo-Vickers Business Forms.

John McGregor-Temple has been promoted to national support manager for UK field marketing operations with Redifon Computers. He was formerly British Rail systems support manager for the company. Financial manager for UK field marketing operations is Andrew Kolmar, formerly branch manager for freight forwarding.

Robert Ondricek has been appointed by Advanced Computer Techniques as vice-president of the company. He joined ACT as a senior consultant, and among his achievements is the design and development of INKODE, a compact storage system with applications for the blind.

Philip Appleby has become sales manager with Time Utilising Business Systems. He joined TUBS last year as a systems analyst.

Frits Janssen has become managing director of Mann Judd Management Consultants, the consultancy branch of Mann Judd the chartered accountants. He was previously group finance director of a Swiss based subsidiary of the Bowater Corp.

Richard Merry-West has joined Compeda as senior technical author. He was previously with GEC-Marconi Electronics as a technical author with the Publicity Department.

William Byrne has joined Datapest as associate director of the electronic printer industry service. He formerly held the position of general manager with Metra Instruments.

Barry Marshall has become systems development manager with Coloroll. He was formerly a computer manager with Langham Life Assurance.

MSTC 21st anniversary

THE Management Systems Training Council celebrated its 21st anniversary recently in London. Present were over 100 management systems experts from the country's leading industrial and commercial organisations, who have been involved in developing or conducting training courses for the MSTC.

Originally established in 1958 as the Organisation and Methods Training Council, it was set up to provide training in the new management technique which emerged after the war, and now trains management personnel from inside and outside its membership.

Colin Colmer, a former organisation and administration manager in the Customer Services division of CTL, has been appointed by Quest Automation as customer services manager. He will be responsible for the company's post sales service in the UK, and Western and Eastern Europe.

Brian Howlett has been appointed systems manager of Honeywell Information Systems in Ireland. For the past three years he has been customer services division manager for Ireland. He is based in Dublin.

Liveware File

by Don

DIARY

MAY 18

Microprocessors — the implications for general management. Southern operational research group, Henley. Administrative Staff College, Henley. Details from Maureen George, on 049 186 454.

AGM followed by guest speaker and buffet. BCS Hampshire branch. The Potters Heron Motel, Ampfield. 18.00.

OPL — a graphics programming language. P. de Gale. UK APL users' group, Imperial College, Exhibition Road, London SW7, 14.00.

MAY 21

Standardisation of high level languages in the industrial real time field. IEE control and automation division. Savoy Place, London WC2. 14.30.

Micros and your business. British Institute of Management. London Penta Hotel, Cromwell Road, London SW7. 8.00.

MAY 21-23

Microelectronics and data processing — the next five years. Infotech. The Cavendish Centre, London.

MAY 22

Formation of Midland regional committee and local branch structure. IOPM. Chamber of Commerce, Harborne Road, Birmingham. 18.00.

Microprocessor fair/AGM. BCS. Reading branch. Park House, Whiteknights Park, Reading. 20.00.

AGM/Presidential visit. Prof Frank Sumner. BCS S Wales branch. Cardiff. 18.30.

MAY 23

The impact of micros on DP management, conference and exhibition. Haase. J. Rogers. IOPM. Bloomsbury Centre Hotel, London. 11.15.

Real time programming languages. NCC. The Institute of Marine Engineers Conference Centre, Mark Lane, London EC3. 19.15.

MAY 23-24

Polymodel 2, a conference on modelling and simulation in practice. Teesside Polytechnic. Dept of Mathematics and Statistics, Teesside Polytechnic, Middlesbrough. 10.00.

MAY 24

Arithmetic processors. R. Dowsing. BCS. BCS HQ, 13 Mansfield Street, London W1. 14.00.

Applications of image analysis to remote sensing. W. Gardner. Nuclear Physics lecture theatre, Keble Road, Oxford. 18.30.

AGM/talk by Prof F. Sumner, BCS President. BCS Leeds branch. Parkway Hotel, Leeds. 6.30.

MAY 24-25

IBM CUA programming group. Centre Hotel, Portsmouth. 14.00.

MAY 24-26

Computers in critical care and pulmonary medicine. IEEE Computer society. Norwalk, Connecticut. Contact Sreedhar Nair, Norwalk Hospital, Yale University, Norwalk, CT 06856.

MAY 30

Computer acquisition, avoiding the pitfalls. European Study Conferences and the Institute of Internal Auditors. Quaglino's Hotel, London. Tel: 067 282 211.

Data manager. MSP. 71 Gloucester Place, London W1. 10.30.

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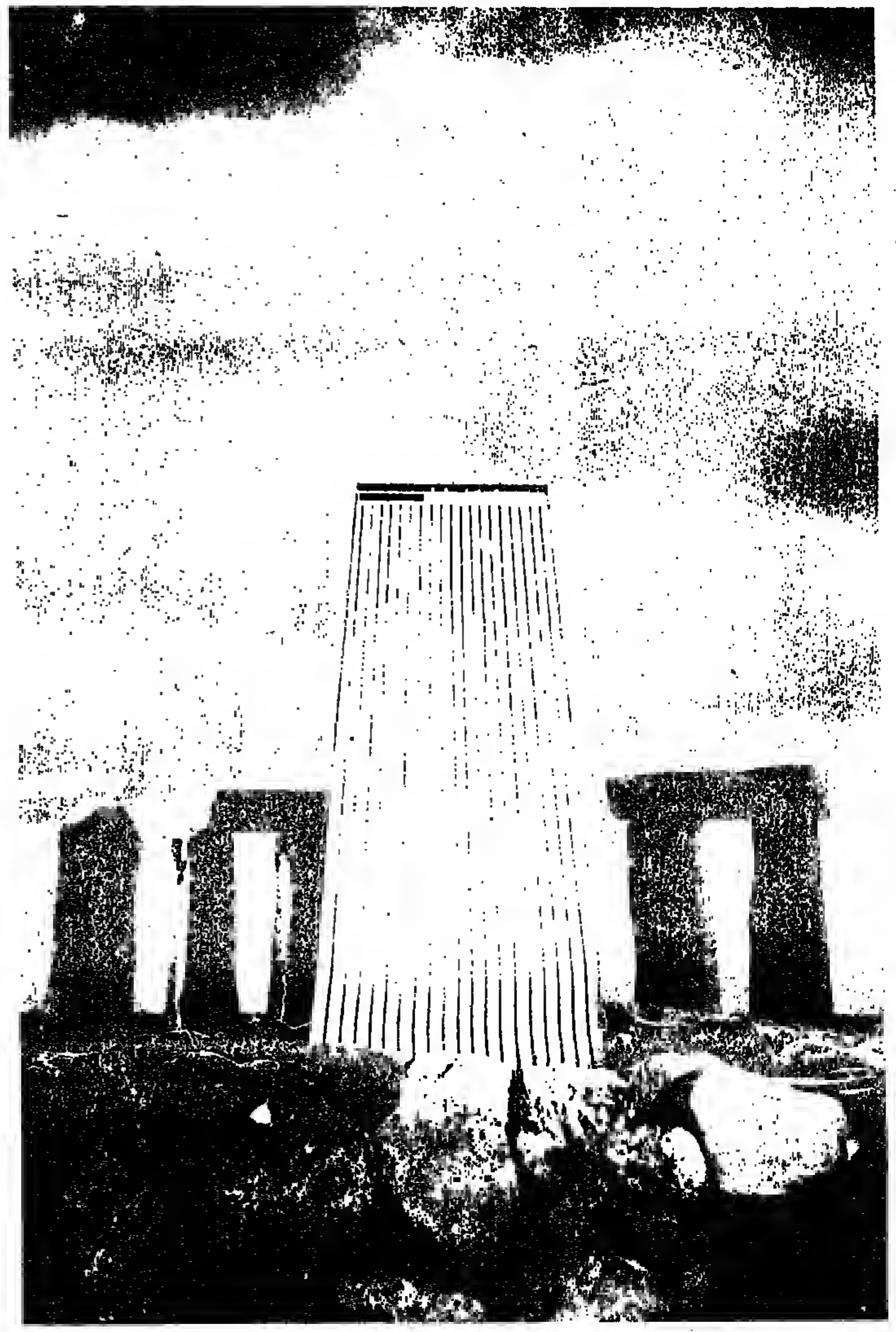

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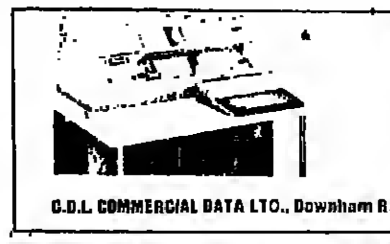

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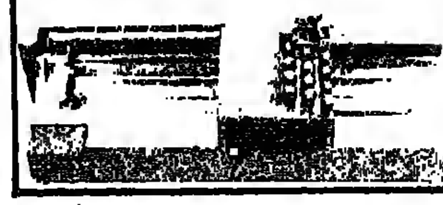

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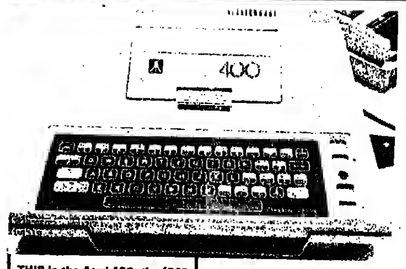
MICRO NEWS IN NEW ORLEANS

By Martin Banks



WHEN a conference oriented more than a little towards the information needs of the American stock analyst fraternity spends time considering the long-term significance of the personal computer industry and marketplace, than that market can fairly be said to have "arrived".

Such a conference was held two weeks ago in New Orleans, US, under the auspices of leading New York stock analysts Morgan Stanley.

Personal computers formed a conference within a conference, the main subject of the event being a long look at the semiconductor business and its future.

Micro News Editor MARTIN BANKS went to New Orleans to hear what the future may hold. This week he looks at personal computers. Next week it will be the turn of the semiconductor business.

THIS is the Atari 400, the 4548 personal computer due to be launched in August by the Atari division of Warner Communications. Based on the MOS Technology 6502 micro, it comes with 8K bytes of RAM and up to 16K bytes of ROM.

With its bigger brother, the Atari 800 system, which can be equipped with up to 48K bytes of RAM, and for which floppy disc systems will be available, it constitutes the company's attack on what could be a multi-billion dollar market by 1985. ROM-based software packages will include such consumer-oriented items as "teach-yourself disco dancing."

Manufacturers roasted by dealers

THE manufacturers came in for some criticism from the dealers at the Forum, when representatives of both large and small outlets had some strong things to say about how the industry does business.

Dan Ellis, vice-president of the New Orleans-based Computer Shoppe, said that manufacturers don't back dealers with the right documentation, or with reliable products. "A good percentage are dead on arrival," he said.

He also claimed that it was impossible to sell systems at the manufacturer's advertised list price, especially as the dealer has to carry the subsidiary costs of repair and customer training. "Most of the manufacturers want money in front; they don't give credit," he said.

Selling to small businessmen was another major problem. "They want a full, turnkey operation for nothing, so we have to try and sell like IBM for nothing," he said, adding that it is impossible to sell a business system under $12,000.

Mike McConnell, vice-president of the US franchise chain, Computerland, indicated that one of the major problems at present is the lack of standardisation in hardware, making software portability impossible.

"We must get away from the 'RCA record for an RCA stereo' syndrome," he said, "because at the moment we have some great 'stereos' but few good records."

Lack of software will limit market growth

THE fact that the software business for personal computers had a total sales volume of $25-30 million, compared to an estimated $350 million worth of hardware sales, is indicative of the major problem the market for such equipment will face in the future.

So said Dan Fylstra, president of Personal Software, at the Morgan Stanley Personal Computer Forum.

The market potential was there, he said, pointing to the fact that general software suppliers are expected to sell over $1 billion worth of product next year — a 40% compound growth rate over 10 years. This, he said, was indicative of the scope for micro-based software products.

The main limitation, however, was going to be the shortage of good programmers capable of fulfilling the market need.

In 1975, for example, there was a requirement for around half a million programmers in the computer industry. By 1985, however, the demand is expected to rise to over 1.8 million, a figure not likely to be met by supplies.

Therefore, Fylstra feels, software will be the most important limiting factor in the development of the personal computer marketplace.

To some extent, there is something of the chicken and egg situation about the software industry for personal computers, for although the potential is large, it is not yet large enough for the bigger software producers to consider entering.

Most of the companies specialising in personal computer software are, he said, one or two-man shops, with only a few "big" ones grossing over $500,000 a year.

And even though a large number of hardware systems are currently sold, he suggested that it is difficult to point to a similarly large volume of good software packages sold to match them.

The long-term potential, however, is enormous. Some industry estimates suggest that in the future software packages will be selling, in unit volume per year, around four times the volume of computer systems.

Many of these packages will be in the leisure markets, though currently this only represents some 29% of the total market. The rest is made up of systems software, 38%, and "labour-saving" business packages, 33% of the total software production marketplace.

The leisure market, however, is expected to have considerable potential, even though it is likely to require some different, innovel, marketing techniques to exploit it. This point was made by Peter Rosenthal, software products manager for Atari.

Having been in the video games, and subsequently the programmable games business for some time, he said that the company had considerable experience of the market. It had sold over 4 million packages to date.

Its approach, he said, would be the licensing of major "names" in specific consumer-oriented market sectors, as a promotional ploy. Such names would, for example, be used to promote packages like a disco dancing instruction package.

TI and Atari will test mass market potential

THIS year will be the acid test of the market for sub-$300 personal computer systems. The entries of Texas Instruments, probably in June, and Atari in August, will show whether the consumer is ready to invest in such systems in the same way as television and Hi-Fi.

This was the view of Ben Rosen, vice-president of Morgan Stanley, in his chairman's address to the Personal Computer Forum.

These two market entries will be important, he said, because they are aimed at the consumer directly, and that market means high-volume sales. This in turn will mean that unit prices for personal computer systems may track the learning curve of the semiconductor industry and come down.

Even though there are some 50 manufacturers of personal computers in the States now, he felt that the future market leaders could come from one of these two new entrants.

And though cynics, he said, might say that being lead company in the personal computer business was like "having the best deck-chair on the Titanic", Rosen indicated that the market potential is liable to be very great.

Some 250,000 units are estimated to have been sold worldwide in 1978, with a value of $350 million. This year, the volume is expected to be 550,000 units, at a value approaching $600 million. Current growth rates, he said, indicate a $2 billion market in nine years' time, though there is speculation that this may be reached by 1985.

Applying only conservative growth estimates — 15% per pound — personal computers will be a $24 billion business by the year 2000.

Entry of giants 'a good thing'

ALTHOUGH the entry of Texas Instruments into the personal computer market is in no way yet "official", considerable interest was expressed by the audience at the Forum in how the industry saw the "probable" entry of the company next month.

Mike Markkula, chairman of Apple Computers, summed up the situation by saying that he saw no threat from TI's entry. "The market is a long way from being saturated," he said, "and as long as the products themselves are good, it can only be seen as a good thing for the industry and market."

There was a strong consensus between the manufacturers that TI, and the more long-term possibilities of IBM and Hewlett-Packard entering the fray, would help expand the market and the awareness of consumers as to what is available.

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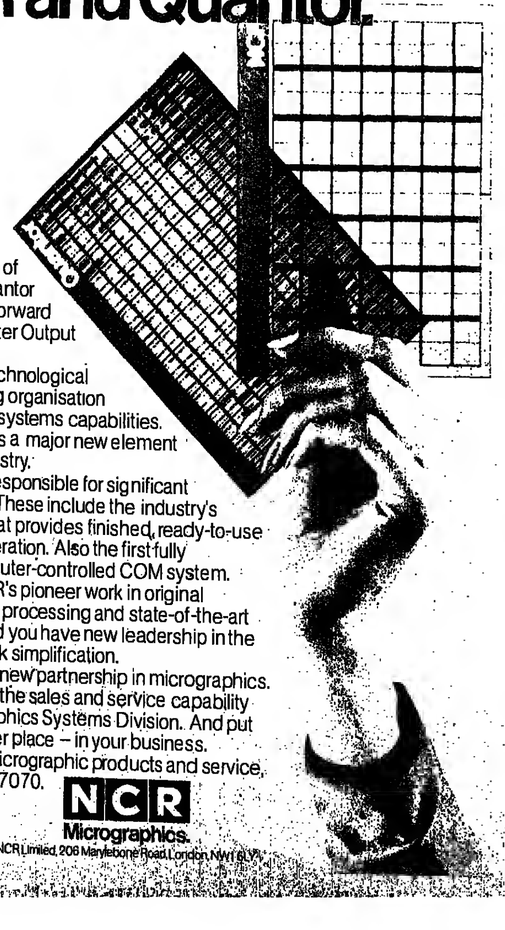

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DATA SYSTEMS NEWS

ISSUE NO 5

Second Generation Supermini Launched

A new chapter in computer history is opened with the announcement of the Perkin-Elmer Series 3200, the second generation of 32-bit Superminis. Perkin-Elmer introduced the world's first 32-bit Supermini back in 1973 and, since then, have sold over 2000 32-bit systems worldwide.

This background of over five years practical experience represents a uniquely solid basis for the launch of the new generation - for example, it adds up to a staggering 500 man years of 32-bit software development.

No other minicomputer manufacturer, it is believed, comes near to matching this capability.

FULL 32-BIT SYSTEM

First available processor in the Series 3200 is the Model 3220, which has full 32-bit architecture and MOS memory in 256Kb modules up to 1Mb, with ultimate expansion to 4Mb. Major features are detailed memory error logging and full memory protection by battery back-up.

The Perkin-Elmer Model 3220 is ideally matched to large-scale commercial applications involving on-line, interactive transaction processing, to military and aerospace real-time simulation and, in conjunction with the globally optimising FORTRAN VII compiler, for scientific number crunching.

INDUSTRY FIRSTS

The Computer Systems Division of Perkin-Elmer has an impressive record of innovation. Achievements include the first microprogrammed minicomputer, the first system with 1Mb of directly addressable memory, the first writable control store with true software support and the first multiport memory for multiprocessor applications.

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According to Marketing Manager, Gordon Ambidge, "The new Perkin-Elmer Series 3200 encompasses everything we've learned during our five years of delivering 32-bit minicomputers and software. These second generation Superminis combine state-of-the-art technology with the customer-proven, 32-bit software originally conceived for our first generation Models 7/32 and 8/32.

The first processor in the series, the Model 3220, is priced like a 16-bit mini, but is clearly in the Supermini class."

MATURE SOFTWARE

The wide range of Perkin-Elmer field proven 32-bit software includes the OS/32 operating system with multiterminal capabilities, ITC, the Transaction Controller, COBOL, SORT/MERGE, BASIC, OS/MTM for multiterminal program development facilities, the industry-leading FORTRAN VII and a HASP emulator.

The Model 3220 is priced from £23,115, with 256Kb of memory, to £40,710 with 1Mb. Since the USA launch in February, early production is fully sold. UK deliveries will start in September 1979.

Woodall-Duckham Chairman, William I. Ryder and Perkin-Elmer Sales Manager, Rob Hollands sign the contract for the Perkin-Elmer 8/32 system.

Versatile System at Woodall-Duckham

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To meet such a requirement, Woodall-Duckham Limited, a member of the Babcock Contractors Ltd. group and a major process plant contracting organisation, selected a Perkin-Elmer 8/32 Supermini after an extensive evaluation of the offerings of some 12 manufacturers.

Woodall-Duckham endorsed the 8/32 as being "acceptable on grounds of performance, capability, facilities, technical support, price and delivery".

Lincom's TOTAL database software had been selected as being appropriate to Woodall-Duckham's needs. The ability to run TOTAL concurrently with comprehensive technical computing services, including on-line communication with Babcock & Wilcox (Operations) Ltd. IBM mainframes and other bureau facilities, was a major factor in the selection of the Perkin-Elmer 8/32.

Implementation will be phased over a two-year period. When complete, the system will combine on-line data capture with a full suite of commercial applications in COBOL including manpower allocation, materials controls, project accounting and other accounting services to give up-to-date management information on every aspect of the activity. Technical computing facilities with software in FORTRAN & BASIC will be provided for users in their own work areas.

The system includes the superfast Perkin-Elmer FORTRAN VII, the only globally optimising FORTRAN compiler available on a minicomputer.

New Text Facility

Just released by Perkin-Elmer, the new OS/32 Text Facility provides editing and formatting capabilities to enable documents of all types to be prepared on any Perkin-Elmer 32-bit processor.

The program runs interactively or in batch mode and text is provided in two forms;

Text I includes the full editing and formatting capabilities,

Text II provides the formatting capability only to format files created under OS/32 Edit.

Price is £650 on tape or £900 on 10Mb disc.

First 3200 OEM

Leading Manchester based software house, Northern Software Consultants, have become the first UK customer for the new Perkin-Elmer Model 3220 Supermini, launched here this week.

1500 USERS

Following an agreement signed by NSC and Perkin-Elmer, NSC will take delivery later this year. It will replace the Perkin-Elmer Model 7/32, purchased by NSC in 1978, for new software development and for maintaining and updating existing systems for their established UK market, currently represented by an impressive 1500 users. As part of the deal, NSC will use the Model 3220 to develop specific accounting packages for the use of Perkin-Elmer's own operating companies throughout Europe.

In a parallel agreement, Northern Software Consultants are also to become a Perkin-Elmer system OEM and will market complete business systems based on the full range of Perkin-Elmer 16-bit and 32-bit processors.

BEST OPERATING SYSTEM

To quote NSC Marketing Director Paul Lakeland "Perkin-Elmer's operating system is, quite simply, the best minicomputer operating system we have encountered. It minimises the effort required to transfer to a minicomputer, application packages developed for use with major mainframe suppliers' software"

Model 3220 Beats Rivals

The newly announced Perkin-Elmer second generation Supermini, the Model 3220, significantly outperforms minicomputers in its price range. With a starting price of just over £23000, it is far lower priced than any other comparable minicomputer

The Model 3220 will directly address up to 4Mb of MOS memory in 256Kb modules. There are eight sets of 16 registers, for a total of 128, each 32 bits wide with four levels of external interrupts.

ACCURACY AND SPEED

Performed on a full 32-bit word, error correction is standard on the Model 3220. Using seven additional bits for each word in memory, all single bit errors are corrected and all double and most multiple bit errors are detected.

A Loader Storage Unit with watchdog timer is also standard. The LSU loads the automatic boot load program in the memory, which then loads the operating system from magnetic tape or disc.

Implemented in 2Kb of PROM, the boot load program also contains the self test which checks out memory and certain processor functions before loading the operating system.

The Perkin-Elmer Model 3220 uses 1Kb of optional bipolar cache memory. With a hit ratio of 80%, a memory access time of 340ns is achieved. All high speed devices, such as mag tapes and discs are connected to an Extended Direct Memory Access (EDMA) bus, which gives a throughput of 8Mb per sec.

The Model 3220 supports up to 1023 devices with four user-selectable priority interrupt levels.

EXTRA PERFORMANCE

The optional Floating Point Processor has 46 floating point instructions available for use. Also provided as an option are 2K words of Writable Control Store (WCS), which can be used to implement special mathematical or scientific algorithms, FORTRAN or COBOL RTL routines or any special functions in microcode. A completa set of WCS development software is also included.

North Sea operators **Unionoil** who always explore the best channels discovered a **Perkin-Elmer** transaction processing system as the right answer to their accounting and data processing needs.

PERKIN-ELMER

Computer Systems Division

227 Bath Road Slough Berks Tel: Slough 34511

The new big name in computers

Copies of Computer Weekly were distributed to many of the 6,200 people who visited Compec Europe.

Belgium catches up with the mini and the micro

LAST week's Compec Europe exhibition attracted more than 6,200 visitors — a substantial increase over 1978. The event, sponsored by the IPC publications Computer Weekly, Data Processing and Systems International, was held at the Centre International Rogier in Brussels.

COMPUTING in Belgium is changing. From being a mainframe-dominated market with a strong IBM orientation, Belgium is now beginning to catch up with the virtues of the mini and the micro and small dedicated systems.

This trend is still at a relatively early stage of development, but a visit to the Compec Europe exhibition, held in Brussels last week, confirmed that it is under way.

People with experience of both the Dutch and Belgian computer markets claim that Belgium is still at least a year behind Holland in its approach to small computers, but nevertheless an awareness that computers does not just mean mainframes, is now apparent.

As in other countries, one of the main agents of change is undoubtedly the microcomputer, and this in turn stimulates a general awareness of the enormous potential of alternative systems from a whole host of suppliers. At Compec Europe the stands which attracted the most visitors were those displaying "personal" computers.

A particularly interesting product was a "second generation microcomputer" manufactured by Data Applications International, a microcomputer engineering company established in Belgium in 1971 by Claude Simpson, an American expatriate. A DAI system can be supplied with from 8K to 48K of user memory, a resident high-speed Basic interpreter and interfaces for domestic TV sets, audio cassette units and hi-fi equipment.

Claude Simpson was extremely pleased with the reaction to his microcomputer at the show and said, "Compec is important for this kind of business. If we were prepared to accept orders from people off the street we could have sold over 100 systems. But we are just getting our sales network up and inquiries are being passed to our distributors."

Another exhibitor with a similar reaction was Claude Duchesne, of Tandy, whose stand was crowded with visitors for long periods throughout the show. He said that many of the visitors were interested in business applications of the TRS80 — primarily accounting and stock control.

Equally pleased was Mr de Cuyper, product manager with ITT, who said that interest in the ITT 2020 (the designation under which ITT markets the Apple microcomputer) had been enormous, with many people asking about business applications.

Interest was also consistently high on the American Data stand, which featured the Ohio Scientific range of micro systems together with the Compukit UK 101, a "superboard" in kit form incorporating a 6502 microprocessor, a 4K RAM, 8K Microsoft Basic in ROM and a keyboard — all for £219.

A microcomputer which was new to most visitors was the SHC 8000 personal computer, exhibited by LSI Small Business Systems. This Z-80 based system is manufactured by Sanei in Japan and marketed under the Teal label. A 16K system with an 84 lpm line printer, two dual density floppy disc drives and Super Basic, sells for around £2,000.

Another company which has extended its microprocessor expertise into the commercial field is INCAA of Apeldoorn, who exhibited a new small office system, the 2000, which can undertake accounting and word processing operations on the same configuration.

Texas Instruments exhibited its DS990 minicomputer-based business system and reported a good reaction from users of time sharing services who wanted their own machines but with communications facilities which would allow them to hook into larger machines, especially IBM mainframes, as required.

Moving up into full-blown minicomputer-based systems, SEMS, the French mini manufacturer, was exhibiting its new SEMS interactive Systems.

According to SEMS spokesman Daniel Art, interest was shown by service bureaux and a lot of end-user prospects; business was expected to come from these potential customers.

Another mini-manufacturer who reported receiving important leads was Crowther of Modcomp. The exhibition was also seen as a means of getting across the company's name and professional image, as Modcomp has just opened an office in Amsterdam.

The growing demand for immediately accessible computing power as opposed to the delays inherent in many mainframe systems is apparent not only in the appeal which the personal computer holds for the businessman and the engineer but also in the development of systems which can be easily tailored to meet such a demand.

Two British companies, Midlectron and Computer Marketing, were both showing "mid-way" building blocks based on the DEC LSI 11 which can be incorporated in small systems. The MV3 from Midlectron comprises a processor, 28K words of Intel memory, a Baydel dual floppy giving 256K bytes of storage per drive and two Quad slots for system expansion, all for a one-off end user price of £3,700.

A similar system is being marketed by Computer Marketing under the designation Comma VO3.

Commenting on the show, Mike Westbrook of Computer Marketing, said that they had received one inquiry in particular, for a large number of DEC printer terminals, which if concluded would pay for their participation in the exhibition.

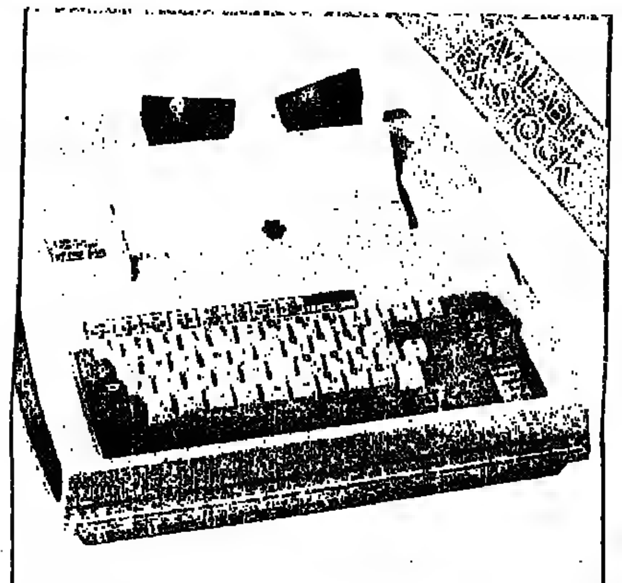
Transdata, also in the British section of the show, reported a good reaction to its CX400 multi-processor micro system and to its Model 318 paper tape converter, a micro-controlled

● Turn to page 17

LEFT. One of the most impressive stands was that of Fungur Computer Products who showed a comprehensive range of enhancement equipment for DEC PDP 11 and other minicomputer systems.

BELOW LEFT: SEMS, the French mini manufacturer, exhibited a SIS-L interactive system capable of handling a high speed printer, seen here in front of the processor, and up to four VDUs.

BELOW: The INCAA 2000 micro-based system which can undertake both accounting and word processing on the same configuration.



765 Portable Bubble Memory Terminal

A fully portable terminal with non-volatile bubble memory that retains data even without power. The 765 has a full ASCII keyboard, virtually silent electronic printing and true 30-cps capability. The powerful command mode uses common English terms and the editing feature provides a simple yet powerful means of correcting and adding data on the spot. The 765 can go wherever you go, cutting costs by letting you batch transmit to your host at cheap call rates.

745 Portable Terminal

The 745 weighs just over 13 lbs – giving you real briefcase portability, yet offering you true 30-cps throughput, incoming data buffering and virtually silent printing. Built in acoustic coupler is standard, with optional auxiliary EIA interface and APL keyboard.

For full details, sign your letterhead, clip it to this advertisement and post them to us now.

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Texas Instruments Ltd., Supply Division MS21, Manton Lane, Bedford MK41 7PA.
Tel: Bedford (0234) 67466, Telex; 82178.

Sales Offices: Bedford (0234) 67466 Extn. 3718, Edinburgh (031) 229 5573, Manchester (061) 432 0645, Slough (0753) 33411.

TEXAS INSTRUMENTS LIMITED

The 4027 colour graphics terminal provided an eye-catching display on the Tektronix stand.

Agency deal signed

AN agency agreement was signed at Compec Europe between Lion Systems Developments of Gerrards Cross and Eurotech Belgium SA and Eurotech Italia SpA.

The agreement, which covers the comprehensive range of network control and switching products manufactured by Lion Systems Developments, extends to Belgium, Holland and Italy.

Commenting on the new link-up, Mr R. J. Bovington, sales director of Lion Systems Developments, told Computer Weekly that he saw Eurotech, a subsidiary of Cable and Wireless, as an ideal company to handle their systems.

He said that he saw the main opportunities for his company in Belgium as lying in the field of network control systems for banks and insurance companies.

He added that it was the first time that Lion Systems Developments had exhibited at Compec Europe and he was pleased at the tremendous number of high-level inquiries they had received.

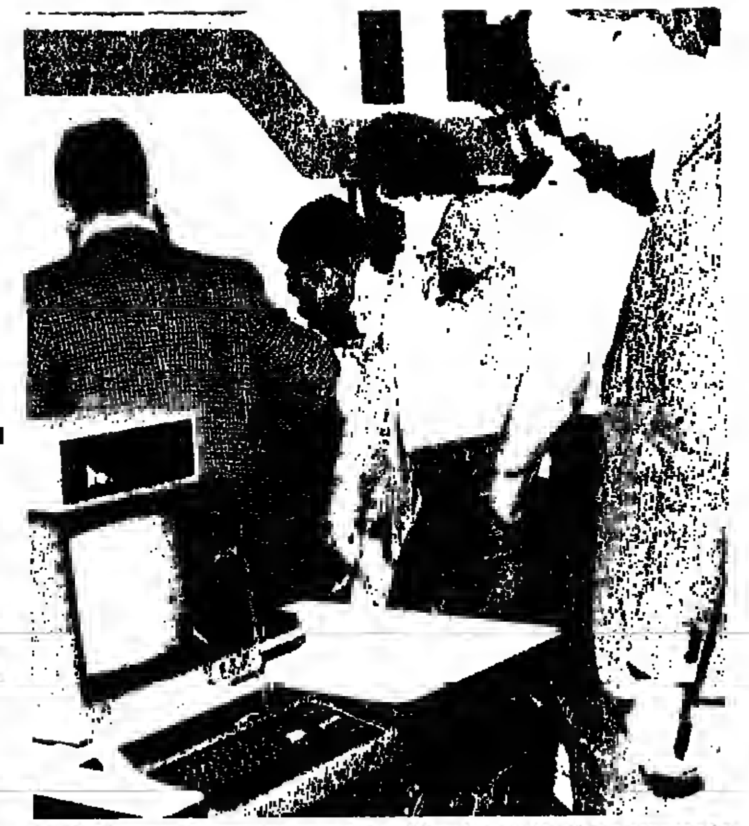
Graphics bureau in Holland

A GRAPHICS bureau has been established in The Hague by Applied Graphics Systems (Europe) BV and Kepko BV, to enable companies to take advantage of computer graphics without having to invest heavily in specialised hardware and software.

The new bureau provides users with the facility to produce management graphs, bar and pie charts, perspective drawings from plan drawings, printed circuit board layouts, and piping and instrumentation diagrams.

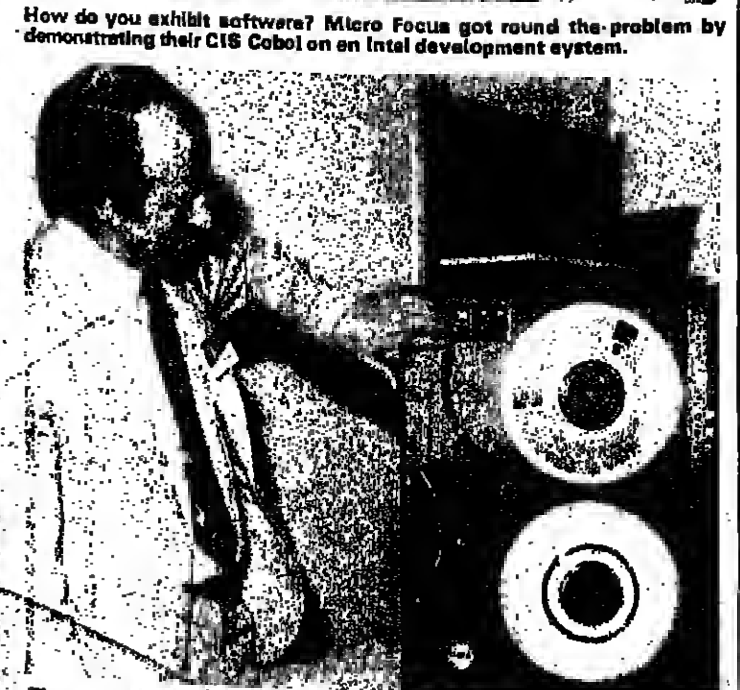
Full duplex dial-up lines operating at a transmission speed of 1200 bps are available so that clients can make use of the facilities of the bureau from their own offices. Alternatively their own staff can use the terminals at the bureau, or bureau staff will process a client's data, returning results to his office.

The bureau is equipped with a Prime 300 minicomputer.



A TRS-80 personal computer, complete with voice synthesiser, attracted a great deal of attention on the Tandy Stand.

How do you exhibit software? Micro Focus got round the problem by demonstrating their CIS Cobol on an Intel development system.



The new EMI 8800 intelligent tape transport, which is microprocessor controlled, was the highlight of the EMI Technology stand.

Belgium catches up

● From page 16

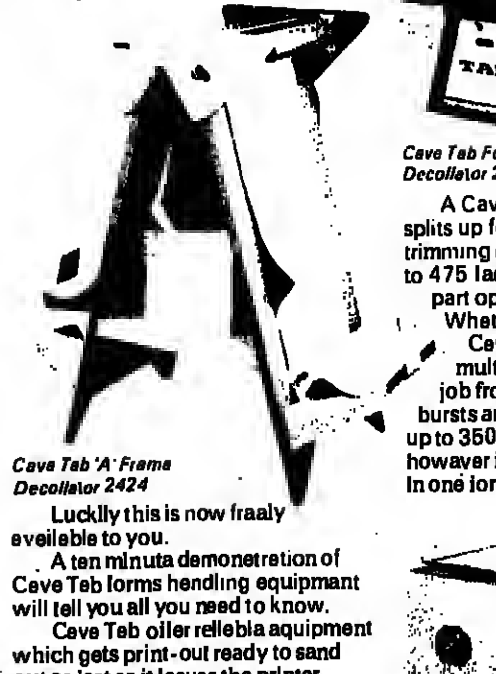
device, which enables Telex messages, for example, to be fed directly into a word-processing system.

Finally, to one of the star products to be exhibited at Compec Europe, the Tektronix 4054 graphic computing system. This unit, which was introduced at the Hanover Fair, is a desk-top computer with a large high-definition screen, making it particularly suitable for use by engineers.

According to Jacques Manscourt, European marketing manager for Tektronix Computer Graphics, the 4054 which has communication facilities enabling it to be used either off line or online to a database on a larger machine, met with a particularly good reaction at Compec Europe.

In ten minutes Cave Tab can show you how to get on top of your computer output.

Computers can be hard masters. Keeping on top of the paper they produce to get the forms out on time takes specialist know-how.



Cave Tab 'A' Frame Decollator 2424

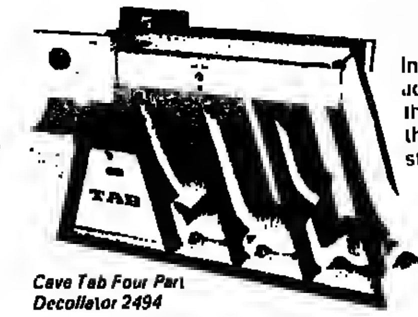
Luckily this is now freely available to you.

A ten minute demonstration of Cave Tab forms handling equipment will tell you all you need to know.

Cave Tab offer reliable equipment which gets print-out ready to send out as fast as it leaves the printer.

For example, a Cave Tab 'A' frame decollator splits a box of two part stationery and removes the carbon at up to 450 feet a minute. It will also deal rapidly with larger sets. Yet it's simple enough for anyone to set up in 45 seconds.

Cave Tab Table-top Miniburster 2464



Cave Tab Four Part Decollator 2494

A Cave Tab four part decollator splits up four part print-outs, trimming and halving them, too at up to 475 feet per minute. Six and eight part option also available.

Whether you decollate or not, a Cave Tab high-speed multi-part burster will take the job from there. It trims, slits, bursts and stacks paper or card at up to 350 feet a minute. What's more, however fast the burster runs, it stops in one form's length.

Cave Tab Imprinter/Merger 2450

You can line up the Cave Tab Imprinter/Merger with the burster to add signatures, centre slit and merge the two halves together. Alternatively the Imprinter/Merger can be used on a stand-alone basis.

And now there's a new, table-top miniburster too – the Cave Tab 2464. Designed for small to medium sized businesses and data centres, it offers all the easy-to-use convenience of the big Cave Tab machines plus the ability to tackle all forms, including cards, at speeds up to 200 feet per minute.

Cave Tab High Speed Burster 2476

Because you rely on your computer output, Cave Tab back this extremely reliable equipment with nationwide service which is readily on call. You'll find Cave Tab service is extremely economical, and our maintenance control is one of the best available in Britain.

So call us for a demonstration. It's quite free. It puts you under no obligation. We do it on your premises.

And it need take up no more than ten minutes of your valuable time. We promise that no ten minutes could be better spent.

Ring Cave Tab on Northampton (0604) 48125 or fill in the coupon to catch up with your computer output.

Cave Tab

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Please tell me more about Cave Tab forms handling equipment
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Investigation into word processing

REGARDING the current importance of word processing, I wish to comment on your recent report (CW, April 19) on the CCA investigation into word processing, carried out at the DES in Darlington. During the investigation, I was heavily involved as technical consultant to the Agency.

It is, of course, the case that the CCA results were gleaned from a live and carefully controlled experiment. The work generated by DES authors was shared deliberately as equally as possible between a control group comprising an automatic and electric typewriters and a shared-logic word processing system, supplied by Wordplex.

However, this experiment, by its very nature, cannot be taken overall as a form of benchmark for general guidance. This is because those interested in using word processing systems, whether government departments or indeed commercial concerns, will obviously use their systems as advantageously as possible, rather than confining themselves to a rigid and particular work mix. Hence comparison is difficult.

Incidentally, before I left the Agency I was aware of the desire shown by the DES to retain their word processing system to be run on their own lines once the CCA experiment was concluded; I believe that they are now successfully doing this.

Concerning the environmental problems mentioned in your report, I can confirm that a large proportion of these were due to an untypically electrically noisy mains supply and earth. Near the end of the experiment, when the supply was made more normal, improved serviceability of the equipment reflected this. The equipment alone was not to blame, as was borne out by high serviceability figures made available by other users.

Finally, the need for elementary air conditioning arose, as it would for any other processor of a similar current consumption, from the choice of a small enclosed room for location of the processor and its accompanying disc units.

H-P. G. KELLY

Leigh-on-Sea,
Essex.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

Training of programmers

THE article by Jonathan Hamilton on the training of programmers (CW, April 19) was an admirable summary of their craft and survey of the problems of DP training.

Unfortunately while arguing against the "leave it to others" attitude in the recruitment of trainees, he falls into this same trap himself. For in his last paragraph he is ready to leave it to someone else to start the ball rolling, ie, "... government training schemes."

However, the answers to the problems he outlines are relatively simple, and a few far-sighted organisations have already got to grips with them. Given the right planning, any user DP department or software house can provide effective training for programmers and make an immediate return on their investment.

Also, given the correct planning, the original investment of trainees can be made much lower. The ingredients of this plan are simple: 1 A proper programming aptitude test to help in selection; 2 Good, but not excessive, initial language training; 3 The correct use of structured disciplines in the installation; 4 Top-up training on advanced topics only when the individual is ready to progress.

In this way, the industry and individual companies can look after their own programmer requirements, and cut down on the loss of productivity and wasted training when staff leave early.

E. D. B. TEBBS
Managing director
BIS Applied Systems

We were first, says H-P

IN a report on the feature forthcoming networking software from Burroughs you[...] that Burroughs "looks [...] become the first" manufac[...] to offer the capability to sup[...] remote databases. This is not [...]

In July 1978, we began [de]livery of Hewlett Packa[rd] Distributed System Netw[ork] software which supports [dis]tributed databases. Like [the] Burroughs system, HP-DSN [can] be used to access remote da[ta]bases through the use of sim[ple] job control changes. In additi[on] remote database access can [be] implemented directly in the [pro]gram code. Yet a third alter[n]ative is to make use of a spe[cial] Data Base Access file.

This approach is particul[arly] useful in that the user does [not] have to enter job com[mand] changes prior to running t[he] program, nor does the program[]mer have to hard-code sys[tem] commands to manage the co[m]munication.

The procedures used to es[tab]lish distributed communicat[ion] are maintained independent[ly of] the application programs wh[ich] ultimately require the rem[ote] data.

Hewlett Packard has ha[d a] major commitment to d[is]tributed processing for ma[ny] years. To quote the Ameri[can] magazine Small Systems Wo[rld] Hewlett Packard "wrote the [...] distributed-system operati[ng] software which actual[ly] worked."

JOHN KASNIC[...]
Senior Sales Representat[ive]
Hewlett Packard,
South Queensferry.

Information wanted

I AM endeavouring to identify those manufacturers who are offering APL on small microcomputer systems. For many purposes interactive APL would be much more useful than interactive Basic, which is the usual offering. I know some companies already have this facility but would like to hear of any others.

Department of Statistics
Newcastle University
Newcastle upon Tyne

Dr D. A. EVA[...]
Senior Lecturer [...]
Statisti[cs]

Sharing case studies for mutual benefit

AS members of a working party for the development of case study material to be used on data processing and systems analysis courses, we are engaged in a survey of the case studies now in use. We wish to collate these studies and make them available to interested users.

So far we have contacted educational institutions but we are aware that there are many organisations in both the private and public sectors engaged in training computer staff. If these organisations use case studies and are willing to co-operate with us by sharing their ca[se] studies in return for ours we [...] see much mutual benefit. The[re] may be educational institutio[ns] we have missed.

Would any interested p[arty] please contact Anne Lee[...] Department of Mathematic[s] Computer Studies, Sunder[land] Polytechnic, Sunderland, Ty[ne] and Wear?

A[...]
Principal lecturer, Manche[ster] Polytech[nic]

A. M. C. LEEMI[NG]
Senior lecturer, Sunderla[nd] Polytech[nic]

Different solution

MY father showed me the puzzler of the four Queens on the [...] board (Puzzler, April 12). He did not bring the solution, so I solve[d it] on my own. Here is my solution:

Q: b3 — d1

As you see, it is different from the solution given by you. It is better because it is reached in only one move. I am asking you [to] print this solution and send me a copy.

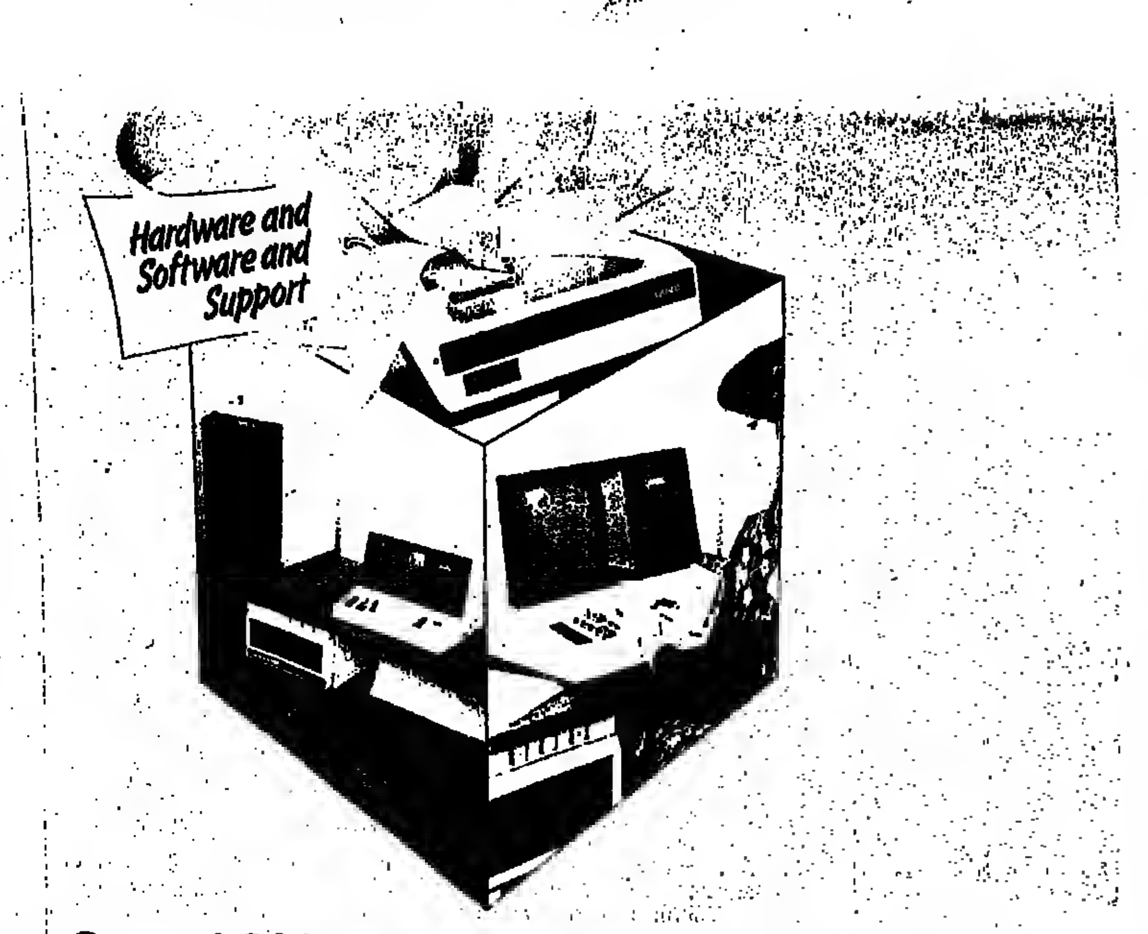
KAJSA OLLON[...]
(12 years)

Oegstgeest
Holland

Puzzler writes: Kajsa's solution does not invalidate my [...] which required that three of the Queens be [...] positions. However, my intention was to create a [...] problem that necessitated the maximum number of [...] striving for complexity I overlooked the simple one [...] — and so perish all clever columnists [...]

Qantel from GCS

The COMPLETELY complete package for Distributed Processing



The Qantel 900 and 1400 series from GCS.

Two complete packages of the very latest in business computer-technology at highly competitive prices that offer a modular simplicity; combined with standard operating software and application programmes; and all supplied, backed-up, and maintained by one company!

Qantel systems use simple modular field upgrades to expand easily with your business, whether your immediate need is for the 970 supporting up to 16 terminals, or the largest multi-terminal 1450 with up to 600M bytes of disc storage, and all utilising advanced memory technology up to 1M.byte. There's even the smaller Qantel 200 series using the same compatible software for low volume requirements at low volume prices.

GCS have this total commitment to standard software throughout the Qantel range and all systems are combined with Qantel's special Report Generator package allowing Management to produce their own reports without special training. All are backed by the enviable reputation GCS has established for nationwide maintenance support to meet all the demands of Distributed Processing.

Together. GCS and Qantel have business computer systems all wrapped up into a COMPLETELY complete package!

GCS a Division of TELEX COMPUTER PRODUCTS INC.

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Please send me details of the Qantel COMPLETELY complete packages of computer systems.
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CW/5

DATA COMMUNICATIONS

Greater choices face users in the Eighties

Data communications are likely to have a much wider impact as new services become available over the next five years.

Facsimile transmission is being revived, with speed and quality greatly improved over the services which have failed to catch on since the turn of the century; packet networks are well established in the US and are now coming into service in Europe; and viewdata services are in various stages of trial in several countries.

In the first article of our data communications supplement Professor Peter Kirstein predicts a qualitative change in the variety and accessibility of data and message services, perhaps encouraged by the report to the DoI last year of the National Committee on Computer Networks.

PTT authorities do not necessarily have a free hand in deciding their own policies. Here Professor Kirstein, of University College London Department of Statistics and Computer Science, outlines some current PTT activities and poses some questions to be considered for the future.

On subsequent pages, articles covering the rest of the spectrum of data communications are contributed by Nick White, Barry Sheffield, Ben Garner and Lyndon Morgan.

By Professor Peter Kirstein

UNTIL now data traffic has been widespread over leased telephone lines; complex private networks have been built upon their use. Where the traffic between specific sites has not justified use of leased lines, there has been a large-scale use of the public switched telephone network, PSTN.

A number of new data services will be becoming available during the next five years, and these could have much wider impact.

Prestel is starting its public debut, and the UK Post Office has already announced a £23 million investment plan for this service. Even by official Post Office plans, hundreds of thousands of cheap terminals with built-in modems will be able to access Prestel databanks.

A number of other PTTs have announced similar plans. In addition, a number of private organisations are setting up similar services, and they will be accessible from the same Prestel sets (in some European countries).

Moreover, the set manufacturers are proposing to add other frills, like cassette tapes, video games for the consumer market, and alphanumeric keyboards for the business market. As yet there is no agreement that the sets will be compatible across Europe, but we can hope this will be the case.

The opening and later expansion of international packet switched data services to Europe and North America (IPSS and Euronet) will allow widespread access to databanks and computing services on a European scale and to North America. The belief that the use of Euronet will be restricted to bibliographic information retrieval has disappeared; it will be a general pan-European data network.

Increasingly, many users will be able to access specialised data services, like the UK packet switched service (PSS). By the early 1980s, access to Euronet and IPSS will be via PSS. Most major European countries will be providing similar access facilities.

High speed switched access to these data networks will not be feasible under the present PTT standards — only dedicated ports of comparatively high cost for the light user will be available (In the US, PSTN access from packet terminals is provided on Telenet). Moreover, the small number of packet ports envisaged, and the tariff rates proposed for annual charges, are clearly interlinked.

A high-speed 2.4K bps text service, Teletex, will be introduced in some countries. It is not yet clear whether this service will force de facto standards on all manufacturers of word processors with communication capabilities, or whether these markets will be considered to be as separate as the present Telex and data terminal markets.

A distinct possibility is that the existence of Teletex may cause standardisation in word processor communication interfaces, but that high Teletex charges will tempt use on a direct terminal-terminal basis via the PSTN. Certainly standardisation in this area is urgently needed.

Facsimile service offerings will become increasingly available. Moreover, the different manufacturers' equipment is starting to become compatible. Several European countries are already proposing public services via the PSTN.

One corollary could be that a directory system may become available. At present it is a mystery whether a proposed recipient has a facsimile device at all, and a telephone call is needed to determine his facsimile telephone number (even if it is equipped for unattended operation).

Communication standards for both group 2 (2-3 minute) and group 3 (sub-minute) machines are becoming available. Because the present standards are incompatible with the data network standards, further changes will occur, but the situation should settle down soon.

An Intelpost international facsimile service is scheduled to start this summer between central offices of the Post Offices of a number of countries. At present UK participation will be limited to a single station on PO premises — but onward transmission to customers' premises is bound to follow shortly. A night-time queued service is also under consideration.

The high cost of leased ports to PSS, with the great availability of services expected once one is attached, will cause great pressure to have private data networks attached to PSS. The PO policy on this point is still equivocal, and standards for accessing individual terminals or hosts on such systems are still non-existent.

What public Value Added Service may be offered in the near future is not yet clear, but a recent Federal Communications Commission filing by AT&T in the US to provide the Advanced Communications Service is a guide to what could be provided. ACS could provide a wide range of transaction and message services.

An easy interchange between the different services mentioned above will be required. For example, it is clear that the information suppliers will wish to input data to Prestel via PSS. People with PSS lines may well wish to use them for facsimile or text, particularly if their traffic in these areas is so low that special dedicated communication facilities are not justified for that purpose. People with Prestel sets will wish to access computers on PSS or Euronet.

These developments will probably require a liberal PO attitude on the connection of terminals to the PO networks, on general licences on the use to which they can be made, and even for Value Added Services.

The usage can be policed only with great difficulty. For example, in the area of teleconferencing it is quite unclear what is allowed. In general, it is very disputable which areas of computer-mediated message services cut across the PTT monopolies, or how these can be enforced. In a recent report* the National Committee on Computer Networks, NCCN, recommended a liberal attitude on this point.

So far I have mentioned Post Office (or in general PTT) attitudes to services and attachments. At least in the UK, the PO does not necessarily have a free hand to decide its own policies. In the NCCN report, out of 17 recommendations, 13 concerned the PO. The PO union representative on the committee disagreed with all but one of those advocating more liberal policies of the PO. I hope this disagreement does not augur successful union pressure to prevent these sensible recommendations.

Digital private circuits will be starting in 1982/83, and will be fairly widely available by 1985/86. Integrated digital switching, under the aegis of System X, will not become available before that period. For this reason, it will not have a significant impact over the period covered in this article. Under digital transmission, voice can be integrated well with the other services (or vice versa!).

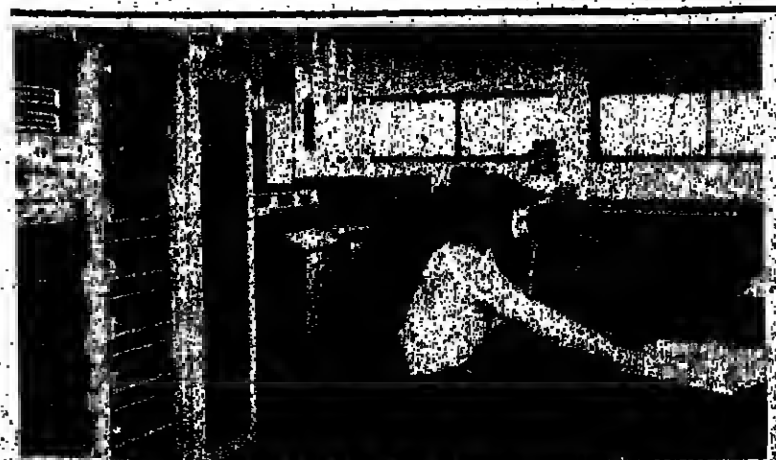
The cost of all digital circuits and transmission is tumbling rapidly, and the services we have been describing are based on new plant — and presumably could be priced cheaply. However, from past experience, we can expect costs to rise, but at a slower rate than inflation.

In summary, the private and business user will soon have available a much larger number of data-related services. I anticipate several years in which it will be theoretically possible, but practically difficult, to access these services. For international access, there will be some delays due to incompatibilities, policy problems and lack of directory information.

Customer bases will be somewhat slow to build up — so that the existing telex and telephone will continue to be closed. Directory services will have difficulty in keeping up with the change of subscribers. However, we can expect a qualitative change in the variety and accessibility of data and message services.

Reference

*** Report of the National Committee on Computer Networks, Department of Industry, 1978.**



The communications room at North Thames Gas, where a rack of Racal-Milgo modems and switchgear provides point-to-point online links between dual ICL 1904S systems with two 7903 communications processors [...]

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'There is a place for private networks'

By Nick White

Private networks provide services complementary to public ones says Nick White, technical development manager at Reuters, who discusses their roles, needs and constraints, and calls for more investment in communications technology, more liberal PTT controls and firm international agreements on interfacing standards and tariff policy.

WHEN one attempts to determine the likely future role of a phenomenon such as private networks, it is appropriate to consider why it exists at all.

Someone who campaigns on behalf of "private" anything runs the risk of being tarred with the same brush as those who defend private education or private health. "My highly intelligent packet will only fully realise its potential through the benefits offered by a private network. My high-priority packet must be afforded the right of jumping the queue of normal packets to get urgent processing — a possibility offered only with *private* networks."

Although one may or may not sympathise with the logic in these analogies, they miss the basic point. Private networks don't provide competitive facilities to public networks – they provide complementary or additional services.

Private networks usually operate on leased circuits with a fixed tariff making costs predictable and performance controllable, by the use of dedicated handwidth at a speed determined by the user, and within limits stated by the provider.

The dedication of valuable circuits to private networks on a leased basis is not a loss of potential revenue to the monopoly PTTs but rather a guaranteed income for them. Indeed, they might be expected to view private networks as the least of their worries, since fewer support electronics are required, and the networks are a valuable source of customers for PTT equipment such as modems.

So what are the special communications needs of private networks? What are the maximum constraints which they can tolerate and continue to survive? How must the performance needs of a private network be protected?

Given the objective of controllable and predictable costs and performance, one can deduce a number of basic needs of a private network.

1. A good working relationship with the PTTs.

It is fundamental to the acquisition of the required licences and circuits, that the monopoly authority in question has a full and accurate understanding of the intended use of the communications facilities to be provided. This can only be achieved by a close and co-operative working contact with the circuit provider.

2. A choice between cable and satellite circuits.

It is a common misconception that the age of rockets and geostationary communications satellites will spell the end of the era of digging up the ground, hanging wires on poles, and laying highly expensive cables on the sea bed with all the attendant maintenance problems.

This is not so, and cannot be so. Regardless of protocol, the inherent loop delay in satellite circuits precludes their use for some applications, eg highly interactive, low response time terminal networks.

3. A choice between fixed and volume tariffs.

Public packet networks are likely to provide communications facilities with volume-related charging similar to the public telephone network. If this is the only tariff available to private networks, a similar charging pattern will be applied to the users of such networks in order to preserve a viable business situation for the network operator.

If an application cannot tolerate a volume-related tariff, and requires a performance that cannot be guaranteed by a public network, you have an impasse and the application will not exist. This is in nobody's best interests, certainly not those of the communications authority who would lose potential revenue. A solution will be found by the PTTs.

4. High-speed, high quality circuits.

The success of private networks has been founded, to a large degree, on the exploitation of available bandwidth to maximum effect, and the provision of sophistication and applications on top of raw communications. For this trend to continue — and it is contended that this is in the interest of PTTs, private network operators and users — there must be more investment and development in the area of improved technology for communications, eg the replacement of analogue transmission by digital transmission.

5. An agreed and committed standards policy.

Public data networks, both national and international, are coming; of that there is no doubt. Private networks will have to interface to them and international private networks will have to interface to several public networks simultaneously. The job of the private network designer will be made much simpler by firm international agreements on interfacing standards and the interconnection of both public and private networks.

Tariff policy in this area must also be settled in advance, if we are to avoid a repeat of the leased line farce, where the tariff for the same circuit can vary depending on which end you order it from! With public data networks and volume tariffs, such a situation would be ten times worse and would stretch even Logica's excellent Tariffica in its ability to provide the communications planner with sensible costing strategies.

On the protocol front, valuable steps have been taken in the right direction with agreements on a layered architecture, with the definition of the various levels, and with widespread acceptance of the X series CCITT recommendations and in particular X21 and X25.

This is not the end of the story though, for just as there are at least 15 different "standard" interpretations of Cobol available from various manufacturers, so there are several variants of X25. We must tread the road warily or we run the risk of the great saviour X25 becoming the modern day communications equivalent of Esperanto.

In summary, therefore, the private network operator strives to provide services which extend the choices open to communications users. For their own part the private network must be able to exercise choice themselves in terms of facilities and tariffing if they are able to pass on that freedom of choice to the end user.

So what are the possibilities that exist with a private network which cannot be satisfied by a public facility?

Excluding for the purposes of this discussion the business of buying circuits from a communications supplier wholesale and retailing them for profit, time-division multiplexing the approach carried out successfully in the US by MCI using AT&T leased digital circuits, but prohibited in most of Europe and excluding also public value-added services such as Prestel, the private network must provide more than the additional value of just switching.

Two areas have already been mentioned – performance and priorities. By their very nature public networks must provide general facilities and cannot provide highly specialised inter-node protocols to minimise packet flight time. Similarly, the arbitration of priorities between different applications/users is a conceptual impossibility and can only really be resolved by the actual administrator of the application.

The same argument applies to error handling procedures, where the optimal approach with regard to data loss and the sequence of restarts is very application-specific.

When one looks at what private networks are actually used for today, the picture reflects the kind of topics addressed above. Large corporations set up intracompany networks with specialised applications of fairly common support applications such as financial management, stock control, invoicing, and use the freedom of choice offered by having communication circuits within their control to mix these applications and optimise the performance and value of the network.

Enhancing value is the other side of the coin to adding value. If you like, the tuning exercise being something that only the network operator can know how to do.

Two further questions must be asked. Firstly, do private networks need to offer cheaper communications than public networks to be viable?

Although this may be suicidal, the answer must be no. One can return to the education or health analogy for one of the examples of this logic. As private networks are fulfilling

● Turn to page 22

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Why effective networks are vital for business

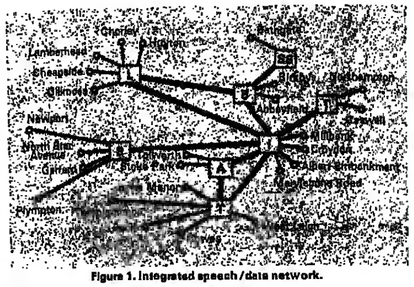

Figure 1. Integrated speech/data network.

Allowing autonomy while sharing computer facilities among the 30 companies of the Plessey Group is a major factor in the design and management of its internal data communications arrangements, as director of management services BARRY SHEFFIELD (right) explains.

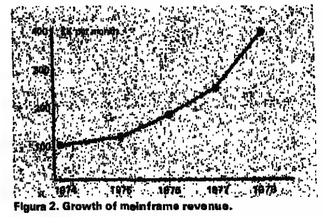

Figure 2. Growth of mainframe revenue.

AS part of its planning for the 1980s, the Plessey Group recognises that effective data processing systems are essential for the development of the business.

It also recognises that the expansion of the Plessey computer network which will occur as microprocessors and minicomputers come into their own alongside mainframes, inevitably means ever-increasing complexity and requires the strongest possible planning and control.

However, the 30 or so Plessey Group subsidiaries in the UK all operate autonomously, and therefore need the ability to control the conduct of their own data processing. Thus there is a need to strike a balance between local control of DP projects and priorities on the one hand and technical control on the other.

In recent years, the use of computer systems has accelerated rapidly among group subsidiaries. This is demonstrated by Figure 2 (above right) which shows the growth of load on the main computing centre at Weybridge.

This centre — which currently houses a 1906S, a 1906A and a 2960 — is at the centre of a data network with high speed links to all major Plessey sites throughout the UK. There are also currently free standing 2900 batch processors at Liverpool and Nottingham and a special-purpose 1902A at Taplow interfacing with a number of Plessey's own computers.

Most businesses need computer systems not only for administrative and commercial data processing (which is growing rapidly and involves many online systems) but also for aids to the engineering function. In this area we are already deeply involved in automatic drawing systems and many other forms of computer-aided design. There is heavy use of the internal time sharing service for scientific purposes, and many special-purpose devices, often based on microprocessors, are being introduced at laboratory and shop floor levels.

It is recognised within Plessey that the administrative and engineering uses of data processing cannot be allowed to grow haphazardly and must be planned in an integrated fashion from the outset. Nevertheless, individual facilities can often best be developed in a free standing mode as long as their eventual integration into the over-all system is recognised.

It is obvious, too, that data communication between group members and also with other parts of industry will continue to develop over the next 10 years and this, together with the fact that wherever microprocessor or minicomputer devices are introduced there is usually a requirement to communicate with other system components, means that an extensive and complex data network is inevitable.

The network must provide integrated facilities not only for data but also for speech, telex, remote conferencing, facsimile and (soon) electronic mail.

We plan to replace our 1900 systems over the next few years but shall do this without pioneering in equipment and software at too early a stage in its development. A major factor in this is that the heavy online use of computers will make high reliability and fail-soft arrangements very important in our thinking.

We have set up a central organisation, Plessey Management Services, which will provide systems and operations teams permanently allocated to individual businesses and working under day-to-day direction from within the business, but with strong technical control from Plessey Management Services.

These local teams are backed up by the central bureau at Weybridge (which will continue to develop in order to cope with the ever-increasing requirement for number crunching and large file handling) and by a software house providing applications packages, specialist consultants, training facilities and sub-contract resources.

The bureau and the software house are required to be financially independent so that their activities can be expanded to match the growth in demand on a business-like basis.

In terms of the development of the combined network, we are already well advanced with the introduction of wideband facilities throughout the UK and are planning the extension of the network to the US and to Europe.

We shall also be introducing a computer-based telex message-switching centre to provide free telex facilities within the group and to improve telex communication with the outside world by providing store-and-forward capabilities. Direct desk-to-desk dialling is already widely available throughout the UK and we have a very practical and economical system for remote conferences.

On the computer front, it is obvious that all Plessey subsidiaries require access to a full spectrum of hardware from microprocessors to mainframes.

Undoubtedly the user devices, largely microprocessor-based, will continue to expand, and we anticipate that before long there will be several thousand of these devices in Plessey UK. Our plans provide for 20 to 50 local processors, small to medium in scale, and one or two mainframe centres, depending on demand.

To minimise the use of scarce software skills we have for some time been encouraging users to adopt standard packages, either produced in our own software house or purchased externally.

Considerable sums have been invested in an integrated materials control package for our major businesses and this is extended to embrace the appropriate financial systems and to integrate with engineering systems being developed in parallel.

A small team of people is producing a continuously expanding range of packages for us.

By separating the use of computers from their management, the users control the turner and Management Services control the latter. In this way we are able to achieve a satisfactory balance between business autonomy and over-all technical co-ordination.

This development policy, covering hardware, software, communications and organisation, together with the availability of advanced Plessey products in the fields of office systems and communications, will enable members of the Plessey Group to continue to improve its competitive position in the market-place.

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So, if you've any problem which calls for a rapid answer, call your local area office and ask for him.

Post Office Telecommunications

Prestel's challenge to telex services

By Ben Garner

BEN GARNER, of GEC Computers, describes some developments he expects to see as viewdata becomes another "natural step in the evolution of the information society," and helps reduce the waste of natural resources as a side benefit.

PROGRESS is hard work. No matter how obvious the benefits may be, improvements in our society do not generally happen overnight. The most able technologist working flat out is several orders of magnitude slower than a futurologist's imagination.

And both are frequently up against the natural inertia of a society which has historically shown a preference for the status quo. Consider, if you will, the tardy general acceptance of such tools as tele-conferencing, Confravision, even the humble facsimile transmitter. The technology is there, the economics can be deduced but the users are a few brave pioneers rather than the masses.

At least data communications does seem set to exert a beneficial influence on our society within the next generation — a society which is being called the information society. No pundits from this author for the label, nor indeed for the uncontrollable urge of some people to slap labels on any set with a statistical content of two or more.

Viewdata systems are a reality. Systems exist in Britain and overseas albeit with very few users at the moment, of whom only a very tiny proportion are unconnected with the development or exploitation of the system in some way. Very soon there will be many, many more, and the availability of receivers will rise whilst costs fall as acceptance of the principle gains popularity.

In the very early days, Post Office statements spoke of our own Prestel as being a system for the home user and added the business user as an afterthought. It is becoming clear now that the first serious users will quite definitely be the business community, because it is they who will be more willing to invest in receivers, and thereby pull the unit costs down.

However, it may be a few years yet before the uncommitted family accepts the Prestel set as the norm. Furthermore, it is the business community which will use data from the Prestel pages to contribute to the profitability of its commercial operations.

So much for the springboard from which projections for the future can be made. All that follows is the author's own purely personal predictions for which no guarantee of certainty is given and from which the author, if proved to be off target, will happily absolve his employers.

I believe the basic Prestel service will, almost from inception, develop along three related lines. As soon as it is established as a general service in this country in the standard form as originally mooted by the Post Office, both the PO's own research people and user reaction will cause:

1. an increased demand for full alphanumeric keyboard in lieu of the numeric keypad, coupled with demands for interfaces enabling the user to intersect with prescribed areas of the Prestel system using front-end software;

2. far greater activity in message passing than was ever anticipated; and,

3. development of international standards enabling users to become members of a worldwide community rather than a national club.

Let me take each point separately. The keypad user is interacting with the system in a way which broadcast systems do not allow, but he is nevertheless still rather a passive user. He selects, views and, at best, slots a few numerals into a frame provided.

This is using Prestel as little more than a soft-copy encyclopedia, which is fine as far as it goes, but human nature being what it is people will quickly look beyond that. Psychology students are sometimes set the standard exercise concerning a man running for a train as a means of demonstrating the way in which achievement does not satisfy desire, it merely superimposes greater desires.

Briefly: when the man is running down the platform all he wants is to get on the train. The very second he boards he substitutes a desire for a seat. If faced with vacant seats he doesn't want any old seat, he wants a particular seat. Before long his desire to simply mount the train has led him along a predictable behavioural pattern to a sunny corner seat facing the direction of travel in a non-smoking compartment sparsely occupied by fellow travellers of acceptable appearance.

Prestel users are just getting on the train. They are sure to want to do more than just access files. Front end software (or telesoftware) is necessary for the next step and this requires the user hardware to be equipped with an area of store adequate to accept programs selected from a Prestel telesoftware library, and to have suitable local processing power.

In other words, personal computers have an important role to play in second generation Prestel terminals.

As for my second point, the crowes chose to a hobby horse ride frequently about electronic mail.

Freight costs; it costs money, it costs time and it costs society a charge on the environment. Go to any railway terminal and see tons and tons of mail about to be physically hauled from one end of the country to the other – and you know most of it is going to end up twenty-four hours later as a waste disposal problem.

The system is unbelievably wasteful and therefore inefficient. It costs trees (for paper), it costs fossil fuels we would be well advised to preserve, it generates pollution and noise.

Previous proponents of this subject have not got much further than discussion papers or feasibility studies. Most have been based on hybrid schemes usually involving a network of regional facsimile transceiving centres and they have not got off the ground because our society will not accept the idea of other people opening our mail.

Prestel gets over this problem by providing a direct sender/recipient pathway. There is of course, work to be done; the present Prestel page size is too small and a good cheap plug-in hard copy printer is needed. At the moment the established telex system has the edge but when in universal use, Prestel will overtake telex since its other features, principally that it is based upon a domestic entertainment device, will cause it to be regarded as a personal, rather than a company, terminal.

And the international aspect? A natural step in the evolution of the information society. Look how rapidly the world has shrunk with the advent of satellite communications and supersonic travel. We British must rate as the worst in the world for parochialism and our shameful attitude to the learning of foreign languages. Now if I had a Prestel terminal with a full international character set keyboard I could enrol in that language school in Outer Utopia and use my front-end software to dynamically.....

Role for private nets

● From page 20

separate need rather than competing with public networks (at least in Europe), the price is not the only deciding factor.

The costs must however be predictable, controllable and not prohibitive. Tariffs must be very carefully pitched, particularly volume-based ones, if the public and private networks are to continue to live side by side in harmony performing their complementary functions.

The second question concerns regulatory constraints. Are the existing PTT-operated controls sufficiently liberal to permit private networks to service all applications which are not feasible with public networks, including some key closed-user group services?

Again, the answer must be no. One can detect a certain easing of restrictions in this area and it is vital that this trend continues. Perhaps volume-tariffing will be the PTTs' route to liberalism. The answer may not be far away.

Whatever the outcome of these vexed questions, one thing seems certain – there will always be a role for private networks and ways will always be found, by the PTTs and the operators jointly, for this vital part of the communications scene to continue to exist.

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How to avoid your updates backfiring

By Lyndon Morgan

Plans for improving a computer-based service can misfire and lead, instead, to degradation of service levels if the change process itself is not kept under control. LYNDON MORGAN, senior consultant in the distributed processing division of the National Computing Centre, offers some guidelines.

THE last 10 years have seen a widespread introduction of computing systems. In particular many organisations have introduced online computer systems with numbers of remote users connected to a central mainframe.

When such systems are first introduced the users will have other methods of processing their work which may be a batch computer system, a manual system or more likely a mixture of both.

To use the new system the users need considerable training but as the knowledge of the system grows so too does their dependence on the service provided.

This is particularly true of systems that provide inquiry facilities, as these soon become the only information look-up method the user has.

The stage, then, is soon reached that without the computer system the users are unable to do their own jobs.

When this stage is reached the onus is on the computer department, having set up the system, to maintain an adequate service level to users.

It must be stressed that the onus is on all computer department staff, analysts, programmers, operators and managers and that the accent is very much on maintaining the achieved level of service and not rushing into a new system with a lower level of service.

While all computer systems will grow because of the addition of facilities they are also subject to change from a number of sources. Although a system may be performing really well constant change can quickly cause a deterioration in the service level.

In this article we shall be looking at possible sources of change and more importantly the ways in which we can control the introduction and effort of such change.

So far we have talked rather glibly about systems, service levels, change and the user. Before proceeding let us make sure we understand what we mean by these terms.

An online computer system is not just hardware and software. An online system is provided to perform a specific job, for instance to process orders. Any action or equipment that goes into processing orders is part of the system.

The service level is a measure of the ability of the system to perform its defined function. Any alteration to any of the component parts of the system constitutes a change, for it may affect the way in which some person or organisation, the user, uses the system.

Note that our definition of user does not exclude computer operations staff. It is particularly important that the operators are considered at times of change.

Let us assume that we have an efficient and reliable system and look at the ways in which we can control any changes we make to it.

There are four basic aims we can set ourselves: 1. to have an effective means of measuring the service level of the system so that any deterioration can quickly be identified; 2. to reduce the incidence of change; 3. to properly control the making of the change; and, 4. to ensure the change does what it is supposed to do and has no side affects.

If we are going to make changes to our system that do not lower the service level we must be able to measure the system in all its aspects. Then over a period we build up a picture of how the system works.

When we make a change, any variation in performance can be detected.

It is important that this system monitoring covers application statistics. That is: numbers of particular transactions, origins of transaction, size of files, as well as genuine performance statistics like response times, peripheral channel usage and telephone line usage.

The worst thing that can happen to any system is that it is subject to constant change. The first step we can take to control the effects of change is to limit the number of times a system is changed.

It is also important to try not to make more than one significant change at a time. If system changes are limited to once a month we can hope to detect any problems or side effects before the next change occurs.

Unfortunately this can only be an ideal. Some problems such as a program error will require immediate change.

However, every effort must be made to limit the number of changes made. Whenever a change is made it is vital that a record of the change is made and that at any time a complete status record of all parts of the system is available.

Without this and a historical record of changes it is impossible to look back at a system's behaviour and see why and where its characteristics changed.

When changes do have to be made their introduction must be carefully controlled.

When changes are being made care must be taken not to make them at times of peak load or critical activity. This requires close contact with all users to let them know the date and exact nature of the change and to resolve any problems this date may cause.

In an ideal world we might expect that all changes could be made smoothly. This is most unlikely even with the best of planning.

Hence there must be a contingency plan to deal with problems caused by change. This is particularly important if the change is such that the previous version of the system cannot be used. All users should be aware of this contingency plan.

All of the ideas contained in this article form part of the plan needed for making changes. No matter how complete a plan is, it is only as effective as the people who carry it out.

As we have already noted, all computer department staff need to be aware of the importance of maintaining user service levels.

At a time of change it is vital that staff have this uppermost in their minds and have the discipline to stick to the rules. Taking short cuts and making assumptions may save time but in the long run invites disaster.

Naturally all changes need to be thoroughly tested and this we shall discuss in some length later. Let us now consider the actual implementation of change.

Changes to online systems, particularly involving data communications, may involve many people and organisations.

It is essential that there is a central control and coordination point that schedules all the tasks and ensures that they are properly completed.

Most organisations have a communications control function within their operations department and it is one of communication control's functions to control change.

As each part of the change is complete there should be a controlled handover to communications control.

Essentially this means that there should be a document which details the change, who generated the need for it, who produced it, who authorised its release for implementation and who is the contact in the event of problems.

When this handover is made, all that needs doing is to tell the operators to load the new version of system on the correct day.

The period of time just after a change is one for careful system monitoring. Some changes will be made to improve system performance, others merely to increase facilities.

The system must be monitored for any effects of the change, for it is this monitoring that records the success or failure of the change and prepares the way for further enhancements.

Communications control will normally bring all system records up to date to record the new status of the system.

With the best planned and controlled change in the world our well behaved system will quickly deteriorate if the changes themselves are not up to standard.

To ensure that a change is up to standard we need a function in the computer department that in industry we would generally call quality control or quality assurance.

The various suppliers of components to our online system will all perform their own quality control. These, however, will be done in isolation. Computer department quality control must bring together these components and test out the complete new system.

Online computer systems, unlike batch systems, have many logical paths through them. Testing can never be complete and so at best change control can only be considered as a containing operation.

The more resources we commit to change control the more we can control the effects of change and so preserve user service levels.

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Honeywell

Call Robin Rankine on 0442 42291 or write to him at Honeywell Information Systems Ltd., Maxted Road, Hemel Hempstead, Herts.

Univac first with bit-slice mainframes

● From front page

tended memory to cache and main memory.

The 1100/60 is based on a research project to do an LSI multi-microprocessor emulation of the 1108 in which a total of seven half-word processors were used to achieve the desired performance. Two parallel micro-instruction streams were used to execute each macro-instruction, while seven streams in parallel were used for memory address calculations. Since address translation is sequential to instruction execution, this approach allows considerable redundancy which is used for error detection and correction.

It is not certain whether this approach has been applied exactly in the 1100/60, but the machine will feature more than one 36-bit processor in each CPU, and one CPU could include as many as 35 of the 4-bit 10800 microprocessors.

Prices for the 1100/60 have not yet been set, but it will feature a dramatic improvement in price performance, and could prove even more attractive than IBM's 4341. The machine will be directed mainly at winning business from competing manufacturers.

A key attraction of the machine is that it will offer users for the first time a low-cost machine on which to run the mature and highly-regarded OS/1100 operating system.

The performance target was something over one million instructions per second, and this has been achieved; the 1100/60 is rated at 1.2 mips, which is below the 1.45 mips of the 1100/40, but should still exceed the power of a uniprocessor IBM 3031.

The 1100/60 will be the star feature of the series of announcements Univac has planned for the National Computing Conference in New York next month. It had been thought that this would primarily be used as a launch-pad for the successor to the 90 series, but sales of this, particularly the 90/30, are reported to be going so well that the new line may be delayed.

THE PRIVACY DEBATE

International experts pool their difficulties

HARMONISATION of computer privacy laws between different countries looks like being even more difficult than expected following a meeting in Bonn of the privacy commissioners of five European nations and of Canada. Difficulties the commissioners discussed involved, among other things, multinational corporations, the Swift banking network, the airlines' reservation system (Sita) and Interpol.

The commissionera from Germany, France, Sweden, Denmark, Austria and Canada had met informally to pool their experiences and to get to know each other. Many problems were aired but the meeting come up with very few solutions. Poramount among the harmonisation difficulties was widely differing control in different countries over data to be sent nbroad.

This variation includes the question of whether or not a licence is required to send personal data out of the country, and what the legal standing is of people abroad who complain their privacy has been violated. The situation in Germany is complicated by the division of authority between the federal government and the separate states.

The commissioners expounded the multifarious problema they are having in administering their privacy laws within their own countries. Widespread difficulty is being experienced with police and intelligence files, which have varying degrees of exemption from supervision in all the countries concerned.

German commissioner Hans Peter Bull cited the furore that had been caused recently in his country by an announcement by the intelligence agency BKA that it wanted to store the names of everyone booking flights of Lufthansa for either external or internal travel, in order to help catch terrorists. This ideas was strongly opposed by the Ministry of the Interior.

The head of the Danish Data Surveillance Authority, Mr J. Paulsen confirmed o common criticism of privacy laws by describing the difficulty he has in enforcing registration owing to the ease with which files con be concealed.

Both Professor Bull and Inger Nansen from Canada were of the view that Freedom of Information laws aa well as date protection laws were necessary to protect privacy. The prospects for such legislation in Germany are not good.

UCSL goes it alone— with profit up 28%

WITH the first announcement of trading details in its 10-year history, Unilever Computer Services has revealed that pre-tax profits for 1978 were £1.2 million, up 28% on the previous year's figure of £942,000.

In the past, UCSL's figures have been included in the group all figures of its parent company Unilever, but it now wishes to be seen as a separate operating company issuing its own accounting reports.

Additional details given is that sales revenue for the calendar year 1978 was at £10.7 million compared to the 1977 figure of £8.4 million.

UCSL operates a data processing bureau, microfilm and time-sharing services, and markets a range of portable data capture terminals.

Two conversions in 18 months due to lack of product data

THE conversion programme under way at one medium-sized company in Bristol underlines the difficulties manufacturers create for their customers by not disclosing their forthcoming product plans.

The collective wisdom of the industry says that IBM will at some stage announce Cobol for the System 38 database-oriented business computer, but no user dare gamble his applications on that. As a result, the user in question will have to undergo two conversions in 18 months, and will have to start writing new programs in RPG II, even though his existing workload is in Cobol.

The company is Masson Scott Thrissell of Bristol, a member of the Molins Group, which is best known for its capital equipment for the cigarette manufacturing industry.

Masson Scott is also in the capital goods business, making secondary handling equipment for the paper manufacturing industry. It offers no-term maintenance on all its machines, and is still maintaining one which was installed in the early 1930s. It has a potential inventory of 90,000 different parts, many of which it would like to handle on a database.

"We have just installed one of the first of the new E35 models of IBM's System 34," said John Spencer, management services manager at Masson Scott. The E35 model features the integrated 128 Megabyte disc drive, 128K bytes of main memory, and the IBM 10 diskette magazine drive.

"We had to get it from a leasing company," said Spencer. "The best delivery IBM could give us was October, so we have agreed with the leasing company that they will take that machine."

What Masson Scott actually wanted (and wants) is a System 38, but it also wants IBM's manufacturing, accounting and production information control system package, Mapics, which is available on System 34, but will not be ready for the 38 until October 1980.

"We had to get a new machine as soon as possible, because we currently have an old Honeywell 2020, which is becoming unreliable and needs an overhaul. Our maintenance contract runs out at the end of the year so we need to have the new machine fully operational by then.

"We have 325 programs on the 2020 written in Cobol C. What we plan to do is translate the obsolescent programs into System 34 Cobol — but although Cobol 68 has been available for about six months on the 34, and Cobol 74 is due shortly, we can't start writing Cobol because the manuals are not available from IBM at the moment."

New applications will be written in RPG II for the System 34; this will of course have to be converted to RPG III for the System 38.

"Two conversions in 18 months is a heavy workload, but we are prepared to do it because we are satisfied that a System 38 with 1,200 Megabytes of disc and an initial 18 VDUs, growing to about 30, will meet all our requirements for the foreseeable life of the machine."

Needless to say, a user putting this amount of thought into the development of his system does not decide on his next machine overnight.

"Honeywell wanted us to move to a Level 64/20, and told us we could run in emulation mode and never need to convert our 2020 programs.

"But they took us to see several users in the UK and in West Germany, and the majority of them told us that the emulation facility was a drain on the resources of the machine, and all the users running said they wished now they had converted to Level 64 native mode straight away.

"But we wanted a database and we anyway were not prepared to make such a big new investment in hardware at that stage."

Among the other machines considered was the Univac 90/30, which generally found favour but was finally rejected on the grounds that it is coming due for replacement with a newer model.

All in all, Spencer sounds thoroughly satisfied with his chosen growth path, seeing the obstacles in the way as a challenge.

Thatcher axe over NEB firms

● From front page

for the UK software industry to have a presence in the US. His company had only accepted the NEB's minority investments because of the existence of the overseas capability.

A representative of CAP-CPP, the first company to join Insac, said Insac was making "quite a considerable contribution" to the expense of its US marketing office at Princeton, New Jersey. CAP itself would have to cover these itself if Insac is wound down.

So far Insac is known to have picked up US business for only one of its members, SPL International, which has a contract with the US graphics systems builder Calcomp.

Pat Coen, chairman of Logica VTS, the first associate of the NEB office systems company, Nexos, said that it was too early to comment on the possible effect of Nexos being run down.

Data communications equipment manufacturer, Case, which is 49.9% NEB-owned, said that a rundown of the NEB would narrow Case's sales and product development opportunities, while Ferranti, in which the NEB has a 50% share, refused to comment on the consequences of an NEB sell-off.

The prospect of the NEB holding in ICL being offered on the market has caused the share price to droop. From an all-time high of well over 500 pence as the election was called the price has slid back and was below 480 before the Queen's Speech.

Data Recording Instrument, in which the NEB has a majority share, is involved in litigation over the NEB-funded disc manufacturing ventura that it plans to set up with Control Data (CW, May 3). DRI minority shareholder, Grundy (Teddington) is trying to kill that venture.

Last week the NEB published its 1978 annual report which showed a pre-tax profit of £31 million, but this become a loss of £41 million after allowing for the extraordinary costs of the closure of unprofitable operations at BL. The car maker accounted for more thon £3,000 million of the NEB's £4,157 million.

Setback for CAP-CPP

IN a further setback for CPP, Boole and Babbage has signed all UK and European distribution rights to its partially owned subsidiary, the European Software Co. CPP will continue to market and support B&B's performance measurement software until the end of April, 1980.

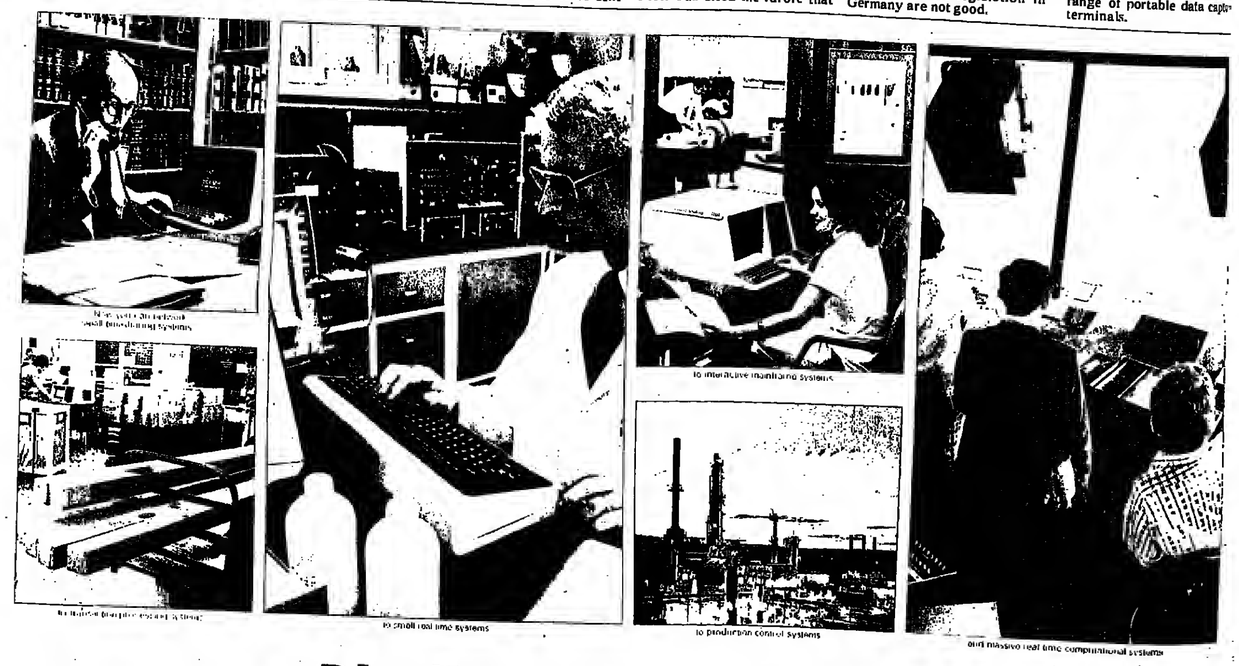
CPP, the software products wing of the CAP-CPP group, met with representatives of B&B and ESC in London last month (Software File, April 5), following the sale of its continental European offices to ADR.

It's now Scicon and that's official

SCIENTIFIC Control Systems — best known as Scicon — has officiely chonged its name to incorporate its widely known trade mark, originnlly invented by Computer Weekly. The company will in future be called Scicon Consultancy Internotional Ltd.

Suspended

PURGING of social security scroungers in Massachusetts by cross-checking of computer files has been suspended by order of a federal judge, who said the investigation should have been conducted according to the stricter rules applicable to probes of criminal fraud.



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Digital House, Kings Road,
Reading, Berks., RG1 4H4

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P.S. There's a London Breadboard too, December 4-8th, Royal Horticultural Halls – come to both!

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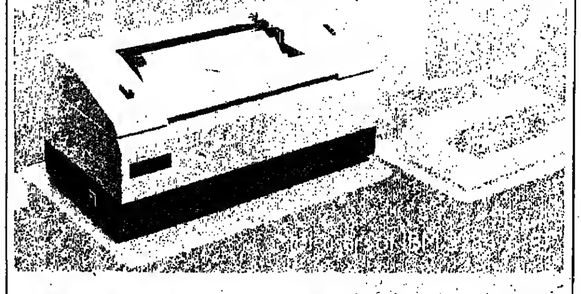

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The year of the solid-state Santa Claus...

Yes, it's early days yet –but not too soon to plan for Christmas

Appropriate noises signal the arrival of the law in this game of Stop Thief—presumably echoes of Kojak...

NEXT Christmas morning children will laugh, trains will whistle, dolls will cry, and wind-up toys will clank, just as they always have. But there will also be a chorus of bleeps and buzzes in many homes, and in some nearly-human voice will methodically run a spelling bee. The computer has come to Toyland.

Yes, Santa Claus has gone solid-state, and as any parent who visited a big toy shop last year must know, he was asked for a bewildering assortment of gadgets. This year there are even more. Some of these play sports, while others play music. Some act like teachers, others like pupils. And most of these toys, in their bright plastic cases, bear substantial price tags.

While there are a few electronic toys and games for as little as £7 or so, most cost £12 to £25, and some exceed £50 when all the options are included. If you happen to have an extra £7,500 in the piggy-bank, you can even get a golf course simulator that uses calculus to put you on Pebble Beach, the famous California course.

There are several kinds of toys and games built around microcomputer circuits and their like. Most of the units on the market are single-player games, but some require two or more participants. The single-ployer games are also suitable for groups of children.

All the games involve either skill or strategy, and some of them require a lot of experience before all their subtleties are mastered. The best of the bunch are fun for both the novice and the master, and grow more interesting with experience.

Some games are based on sports such as football or motor racing, others on pinball machines. The better offerings let the player increase the difficulty of a game by speeding up play or by other means. A number of the sports games are hand-held, which makes them particularly good for use on trips.

Parents and children are likely to see the resemblance between these skill games and either arcade amusements or TV set add-ons. There are similarities, which will discourage parents whose TV games have been idle since New Year's Day, but there are differences too. For one thing, the new electronic skill games don't tie up the TV set.

A related group of electronic toys involves simulation, often with a science fiction theme. These toys make noises and flash lights as children run the controls of, for instance, a space ship or robot truck. One of the more popular items of this genre is Starbird, which is made by Milton Bradley. It has been offered in the US for a year, and for 1979 will be joined by two other Starbird toys.

Another kind of electronic amusement is the learning game. There are several based on electronic calculators, and they offer arithmetic quizzes or number puzzles. They come from companies which have been successful in the calculator business, or from traditional toy-makers who hope to move into new realms. Typically, the arithmetic drill toys are called "professor" or "teacher" by their producers.

A close cousin of the maths quiz machine is the quiz computer that is used with a book-and-answer module. This kind of game is the descendant of those old electric quiz units that had two wires and a light or buzzar. When a question and answer were correctly paired, the machine would go bananas. The electronic versions are more sophisticated but appeal to the same type of child.

The most amazing of the learning-teaching machines will give a spelling test, play the spelling game Hangman, and make or break a simple code. Speak and Spell, from the laboratories of Texas Instruments, actually speaks with a synthesised voice. It is built to accommodate interchangeable vocabularies.

These maths, question-and-answer, or spelling games have been characterised as learning aids by some of their makers, but it is not clear that they will help all children to learn. Arithmatic tables and spelling, however, are indeed learned by memory (and the spelling machine is filled with words that defy phonetic spelling), which is the basis of the educational claims.

The question that parents must ask themselves, particularly if they have limited budgets, is whether these games are good value. For some children, £25 worth of well-chosen books may teach more spelling than a talking computer. On the other hand, a spelling bee is a social event as well as a learning experience. Similarly, many games, electric or otherwise, involve counting, adding or subtracting in the course of play.

The most popular of these amusements is Milton Bradley's Simon, which is expected to be bought by a million families this year. Available only in the US and Canada last Christmas, it will be sold in Europe, too, during 1979.

Parker Brothers' Marlin is running second; it offers several games in one unit, a feature that puzzles some and pleases others. Both of these devices are made from the same tiny computer, the TMS 1000 developed by Texas Instruments, which comes with varying degrees of memory capacity and computing speed.

Finally, there are several games for two or more players. These are strategy games, and may involve simple rules, as draughts does, or require an understanding of a situation drawn from the world of military tactics.

While European stores will for the most part stock games tried on an American audience last year, Americans will be getting a chance to buy several new products.

Milton Bradley has begun to offer electronic toys for pre-school youngsters. These items make sounds and flash lights. But the more advanced products of Milton Bradley are suitable for both children and adults. The most expensive item in the MB line, and perhaps the most expensive game that many Americans will buy next Christmas, is a unit called Microvision.

The basic device contains a microproceasor and various control circuits. Into the hand-held control unit drops a game panal, consisting of a few pressure-sensitive switches, a liquid crystal display field and some memory. The Microvision set encompasses an elementary version of pinball, a breakout game like those run on personal computers, a slot machine, bowling, a Star Trak war game and a visual puzzle called Mind-buster.

At more than $50 for the control unit and $16.50 to $18.00 per game module (US prices), Microvision appears to be aimed at the affluent toy buyer or, perhaps, the adult who wants toys he can share with children.

Regardless of the high price, Microvision represents an advance in engineering, and it is likely to be the most successful application of large (about 4 sq in) liquid crystal displays this year.

The other advanced toy from Milton Bradley is a truck which can be programmed to perform various tasks such as moving in various directions, turning, firing "phasar" guns and operating an accessory transport unit that will carry or dump a load of toys under program control. The truck, called Big Trak in the US, will sell for more than £20, and the motorised accessory for about £7.

Milton Bradley's keenest rival in the US is Parker Brothers, best known for its game Monopoly. Parker did well with electronic games in the US last Christmas, and has added several interesting items to its repertoire. Games which have been sold in the US during 1978 will reach Europe for this Christmas.

The item that will probably lead the Parker Brothers line in 1979 is a hand-held pinball machine called Wild Fire. It makes noises (and even has a volume control), keeps score for up to four players and can, in a simulated way, be tilted.

This machine will cost around £20, making it the most expensive item in the Parker Brothers 1979 range.

An electronic version of a board game which resembles Clue has also been developed by the company's inventors, an independent firm called Micro-Cosmos, located in Cambridge, Massachusetts. This game, called Stop Thief, requires players to keep track of their moves on a game board while telling a hand-held computer about various events in the play. The computer responds in several ways, the most amusing of which is the provision of audible clues, such as a breaking window or the movement of an invisible thief through a squeaky door.

The police can come, too, and Stop Thief's micro will make appropriate noises to signal the arrival of the law. A battle may ensue — or at least the sounds of the battle — as the computer reveals the outcome of the players' (and its own) activities.

Parker will begin selling its new games in Holland (through Clipper), in the UK (through Waddingtons and Palitoy), and in France (through Miro) in the spring of 1980, too late for Christmas but early enough to provide electronic nanny services for your young ones during the summer holiday season.

The items which seem to be going over best are well made and ingeniously designed. They are the most interesting things on toy shelves and, notwithstanding their prices, appear to offer good value.

At the well established game companies like Parker Brothers and Milton Bradley, and at some of the newer ones as well, panels of children much like your own rejected dozens of prototypes and embraced the handmade first editions of the games that are now in production. Children from various nations test the international versions of the games. While this is no guarantee that children will enjoy the gadgets, it does improve the odds.

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No technograph here: a truck which can move in various directions and operate an accessory unit that will carry or dump a load of toys under...

PRODUCT NOTES

Harris' 8000 matrix printer

AS an enhancement to Harris' 8000 series, a cost effective matrix printer has been introduced. Called the Harris 3155, it is a 60 chps printer and like the other system in the 800 series, is compatible with IBM 3270, Honeywell 7700, Univac Uniscope 100/200 and Burroughs TD800.

Harris designed the 3255 for users who require small clusters of displays where the actual print time and number of displays accessing the printer is relatively low. The printer is also suited to provide local print.

The 3155 is housed in a desk top unit, but an optional print stand is available for users who require a free-standing unit. The printer can be located up to 2,000 feet from the controller. It features an automatic on/off control which turns the motor on when a print or paper movement command is received, and off 10 seconds after completion of a print operation. This reduces motor noise and unnecessary wear.

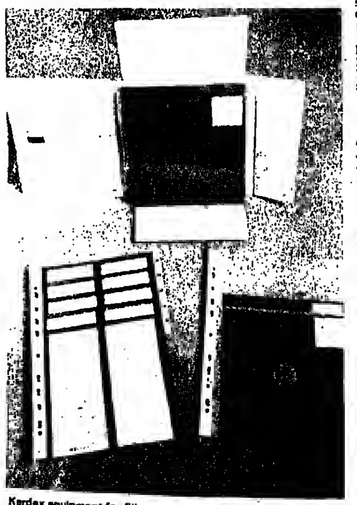
Multi-part or non-standard forms may be used, and the tractor feed mechanism can be adjusted to accommodate paper widths up to 17.3 inches. Print characters are available in Ebcdic for 6170/8160 systems and in Ascii for 8210, 8220, 8160 and 8770 systems.

Harris Corp (CW), Data Communications Division, 148 Farnham Road, Slough, Berks. Tel: 0753 34666.

Harris 3165 matrix printer.

Kardex filing range

DATA carriers for word processors, accounting systems, phototypesetters and other advanced computer-controlled equipment, are now available from Kardex Systems as part of their reference equipment range to accommodate floppy discs. For filing the discs is an A4 panel with a rod type hinge which will fix existing units; easel binders, desk stands, wall brackets and rotary stands. For carrying floppy discs is a pouch which will hold up to 10 discs.



Kardex equipment for filing and protecting floppy discs.

Both the pouch and the easel binder, which folds flat and in half when not in use, fit into a Kardex insulated data safe for security and protection.

Kardex Systems (CW), 2 Dyers' Buildings, Holborn, London, EC1. Tel: 01-405 3434.

Tape drive

THE Facit/DEI high density tape deck stores 17.28 Mbytes on a single ¼ cartridge. Four-track serial recording at 6,400 bpi density provides 17.28 Mbytes storage capacity with a 450 foot cartridge. Transfer rate is 192K bps. The deck from Facit Data Products, is designed for OEM users and qualified end users.

Facit Data Products (CW), S-105 45 Stockholm, Sweden. Tel: 46-8-738 80 00.

Recorder

A DIGITAL cassette recorder which can store up to 360K bytes of data on a standard C60 cassette has been introduced by K and N Electronics. The recorder known as the Datadec 701, uses a circulating buffer store. Error checking is built in and if an error occurs a visual display read-out will indicate the corrupt block number. The Datadec 701 is switch selectable from 75 baud to 800 baud through the standard bit rates.

K and N Electronics (CW), Cordwallis Street, Maidenhead, Berkshire. Tel: 0628 22447.

Diversifile

THE Diversifile from Flexiform performs 12 functions, including paper securing attachment. From a basic file, accessories for a particular use can be added, and the Diversifile is inexpensive and hard-wearing.

Flexiform (CW), Euston Road, London NW1 3DT. Tel. 01-387 0182.

Kodak microfilmer

THE cheapest rotary microfilmer in the Kodak range is currently available. Called the Kodak 250 Microfilmer, it is a manual feed desk top 16 mm microfilmer, and sells at £985 plus VAT. The new product features interchangeable cassettes for batch filing, and microfilms documents of up to 300 mm wide, and of unlimited length at a reduction of 2:1.

Other features include a document counter, a film movement indicator and image spacing control. Optical and audio warning signals indicate lamp failure, incorrect film loading, or failure to push the film unit fully home, so that the 250 is ideal for use in general office conditions.

Kodak Ltd. (CW), PO Box 66, Kodak House, Station Road, Hemel Hempstead. Tel: 0442 61122.

Kodak 250 microfilmer with interchangeable cassettes.

CPU floppies

THE peripherals division of CPU Computers, have cut the price of their floppy diskettes. A comprehensive range of 8 inch and 5¼ inch single and double density floppy diskettes, which can be used on all leading makes of floppy disc drives has been reduced by up to 50%.

CPU Peripherals (CW), CPU House, Copse Road, St John's, Woking, Surrey. Tel: 04862 73883.

Pericom's micro-controlled VDU.

6803 VDU from Pericom range

PERICOM have announced the third model in its range of microprocessor controlled visual display terminals. The 6803 differs from others in the 6800 series in allowing the user to switch between 80 column and 132 column format.

The VDU is primarily designed for use with printers and associated software and Pericom is offering the 0803 together with its Hycom matrix printer as a packaged K&R alternative which allows simultaneous display and print up to 9,600 baud or selective screen printing.

As with all the 6800 series, the 6803 offers a programmable detachable keyboard, plus a 15 inch anti glare screen with green characters. Display features such as cursor address, block transmission, underscoring, inverse index and reduced intensity are all available.

Pericom Data Terminals (CW), 1/3 Burners Lane, Kiln Farm, Milton Keynes, Bucks. Tel Milton Keynes 564747

Raster graphics terminal

AN integrated high resolution raster-scan unit which can be used with any computer system and language is the T5600 graphics terminal, made by Sigma Electronic Systems of Horsham.

It has a display resolution of 768 x 512 will operate in X-Y vector, histogram and symbol modes, and produces pictures.

The terminal has a detachable keyboard which provides the full 128 Ascii character set, a TTY lock facility, and a high speed numeric entry pad together with keys for reset, duplex and cursor control.

Sigma Electronic Systems (CW), Church Street, Warnham, Hersham, Sussex.

Casio's CQ-81 calculator

Calculating clock

THE latest calculator from Casio is also a quartz digital clock with liquid crystal display. The CQ-81 has eight digits capacity with constants. It measures 128 x 70 x 42 mm, weighs 137 grams and costs £21.95.

Casio Electronics Co Ltd. (CW), 28 Scrutton Street, London EC2. Tel: 01-377 9087.

600 baud O/P

VENTEK has introduced the Model 1004 terminal, for hard copy data retrieval which is compatible and directly interchangeable with visual display units. As a result of this, the need arose for a small but reliable printer. This is the Victor 130 matrix printer which is supplied by Dataplus of Cheltenham. The unit is fully integrated into the 1004 terminal where it operates through an RS 232C interface with memory and buffering facilities allowing line by line printing at speeds of up to 600 baud.

Dataplus (CW), 39-49 Ironsmonger Road, Cheltenham, Gloucestershire. Tel: 0242 30030.

ASR printer

AN electronic send and receive printer terminal has been announced by Trend Communications. It is claimed to be simple to operate, is low cost and a microprocessor prompts the operator in an interactive mode. 8K or 16K bytes of memory are available and a battery back up is provided to retain the data.

Trend Communications (CW), Edric House, Castle Street, High Wycombe, Buckinghamshire. Tel: 0494 40171.

EPROM

THE 2732, from GEC Semiconductors, is a 32K ultra violet erasable programmable read-only memory, or EPROM. It is pin-compatible with the Intel 32K and 64K ROMS. Memory size can be changed by plugging in a different device.

The device retains the two control lines of other Intel EPROM and ROM devices. Parameters include an access time of 450 nanoseconds, single 5 volt supply, single address programming and three-state output. Complete programming of the 2732 can be accomplished in 3.5 minutes.

GEC Semiconductors Ltd (CW), East Lane, Wembley, Middlesex. Tel: 01-904 9303.

Shade's low cost convertor

A LOW cost V24/20ma interface convertor for computer users with compatibility problems, has been announced by Shade. The device converts the send and receive circuits of a 20ma terminal into V24 compatible signals and vice versa, providing a quick solution where terminals do not match computer interfaces. Two convertors can be used where existing V24 terminals are needed, at distances exceeding those allowed by V24 interfaces.

Two mountings are available for the device; a free standing conversion system and a rack mounted system supporting up to eight units.

Shade Computer Services (CW), 1 Pafford Street, Calne, Wilts. Tel: 0249 815757.

Model 700 security aid

AN office size security disintegrator, which destroys confidential material such as microfilm, microfiche and high security documents, is the latest security aid from Volumatic of Coventry.

The model 700 is the size of a small filing cabinet, is electrically powered and virtually silent in operation. The machine reduces material to a fine powder, which is automatically collected and compacted for easy disposal after it is destroyed.

With a built-in vacuum system which eliminates dust, the Model 700 will destroy all types of film, paper and forms. It is 44½ inches high, 21 inches wide and 23 inches deep. It costs £1,885, plus VAT.

Volumatic (CW), Taurus House, Kingfield Road, Coventry, West Midlands.

Power unit

MODULAR Power has introduced a line of modular encapsulated power supplies incorporating current foldback. The main advantages include automatic load sensing circuit which shuts off the output regulator transistor when the output regulator is overloaded. Called the 400 series, it provides a high performance solution for the powering of analogue and digital modules.

Modular Power (CW), 38 Sun Street, Waltham Abbey, Essex. Tel: 01-391 1374.

VDU camera

THE problem of obtaining colour hard copy from graphics or viewdata displays has been solved by Graphic Display Systems, with the introduction of the GDS1000C hand-held colour hard copy Polaroid camera system. It costs about £275.

Graphic Display Systems (CW), 76 Hemingford Road, Cambridge, CB1 3BZ. Tel: Madingley 64

One of Shannon's tape collars

Shannon tape collars

A RANGE of low cost tape collars has been introduced by the Datastor division of The Shannon Limited. The "DAC" collars are made of rigid plastic, and are available in three sizes to fit 2,400ft, 1,200ft and 600ft magnetic tapes. Tapes can be easily fitted into the collars by using a locating band at the near edge.

Shannon Datastor Division (CW), The Shannon Limited, St Margaret's Road, Beckenham, Kent.

3½ digit LED

A THREE and a half digit, half inch high, light emitting diode display is one of the latest products in National Semiconductor's optoelectronic products line. Known as the NSB3361, it is designed especially for instrumentation applications such as power supply readouts, multimeters and panel meters.

The display is compatible with National Semiconductor's ADD3501 DVM chip and other DVM chips from other manufacturers. It can be connected by PCB type terminals on the sides of the display. It features separate decimal points.

National Semiconductor Ltd. (CW), 301 Harpur Centre, Horne Lane, Bedford. Tel: 0234 211262.

Appointments

RATES:
£10 per single column centimetre
SERIES DISCOUNTS:
7—£9
13—£8
26—£7
52—£6

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Ken Walford 01-261 8434

MANCHESTER/GLASGOW
Owen Kelly 061-872-4211
Geoff Aiken 061-872 4211
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COMPUTER WEEKLY—Highest requested circulation at a cost per thousand 25% lower than the nearest competitor.

1st CHOICE

Programmers and analysts - your contract for success

PDP Basic Programmers — Holland c. £20,000 p.a.
A large successful Chemical Company have immediate and future vacancies for Basic, Basic+2 and Mumps people to work on a variety of different systems. Remuneration will be c. £20,000 p.a.
Call Richard Kaluzynski, Neil Williams or Suzy Gillam for details.

IMS Experience? Earn up to £12,500 p.a.
We have an increasing number of vacancies for programmers with experience of IMS. If you have these skills and would be available to start work at any time in the next three months, a call to Neil or Richard at once would be well worth while.
If you don't generally do contract work you may still find that we can offer you some interesting alternatives. And we're part of the BOC Group — IMS users themselves.

Programmers - if you've got the skills, we've got the contracts

OVERSEAS
PDP FORTRAN + REALTIME —BRUSSELS
ICL 2900 SYSTEMS PROG. —GERMANY
INTEL 8080 ASSEMBLER —GERMANY
PDP FORTRAN —HOLLAND
D.G. NOVA ASSEMBLER —AMERICA

U.K.
IBM OS COBOL + IMS —KENT
IBM OS COBOL + IMS —BEDS
IBM OS PL/1 —HERTS
IBM RPGII + CCP —N. LONDON
VENTEK DATASHARE —N. LONDON
PDP ASSEMBLER/CORAL —HERTS

D.G. NOVA ASSEMBLER + REALTIME —HERTS
HONEYWELL COBOL + IDS —N. LONDON
HONEYWELL L61 COBOL —SCOTLAND
Call Richard Kaluzynski, Neil Williams or Suzy Gillam for details.

Permanent Career Opportunities for Operators

BURROUGHS B700 **WC1**
A West End company are seeking a Senior Operator/Manager. The job entails checking input and output data, liaising with software houses, and a small amount of operating. A mature attitude & some operating exp. are the necessary requirements.
SALARY: £5500-6000 p.a. Call Sally or Elaine.

ICL 1900/2900 **MIDDX**
A large installation in Middx. are now recruiting Operators with a min. of 2 years ICL 1900 George II + exp. to work on a three shift system with subs. staff-canteen, non-contrib. sickness scheme & 23 days hols.
SALARY: £3,700-£4,700 (Snr. Ops. up to £5,700). Call Sally or Elaine.

ICL 1901T GEORGE I **CITY**
An American banking co. are currently looking for an Operator with 1yrs ICL exp. to work a 2 shift system. Lots of perks incl. L.V.s and luncheon allowance, non-contrib. pension scheme, free life assurance, mortgage subsidy, personal loans, interest free season ticket loan.
SALARY: £4,000 + S/A. Call Sally or Elaine.

SYSTEM 3/15D **EC3**
An Insurance Company in the City are looking for an experienced Data Control Clerk. The job involves setting up jobs & checking etc. Hours 9.30 a.m — 5.00 p.m., 45p L.V.s, season ticket loan & free life insurance.
SALARY £3,000-3,500 a.a.e. Call Elaine or Sally.

IBM 370/115 **WATFORD**
A manufacturing company in Herts. is seeking 2 ops. URGENTLY! If you have 18mths-2 yrs exp. on any 370 machine using DOS/POWER, this could be the job you are looking for. 2 shift system soon changing to 3. Company bnfts. inc. subs. canteen, free life assurance & staff discounts. SALARY: £4,500 with a review after 6mths. Call Elaine or Sally.

IBM 370/148 **WORTHING, SUSSEX**
A well known building society are looking for a Shift Leader for their IBM 370 site. The min. exp. requ'd is 5 yrs IBM running under DOS/VS POWER. VM/CMS & CICS exp. an advantage. The company offer free life assurance, a preferential mortgage & excellent recreational facilities. SALARY: £5,200 incl. Call Elaine or Sally.

Knight

Phone anytime, or for an application form leave your name and address with our answering service.
All vacancies are open to both male and female applicants.
Knight Computer Services Ltd.,
14 Old Park Lane, London W1Y 4NL

01-491 4706

or when busy 01-439 3411

JBA

SOUTHERN GERMANY

Our client is a well established and highly regarded German systems house, which has specialised very heavily in software development and high level consultancy. Some of the opportunities available are:-

Senior Product Planner — neg. c£25,000 +

To assist and advise in the planning and design of new software systems and existing product plans; prepare presentations and reports for customers. Experience in all these areas is essential for this very senior position.

Database Architect — neg. from £20,000

To perform high-level consultancy function to both manufacturers designing and developing database software and for other types of clients. A proven track record of preparing and presenting proposals, designing system solutions to Db orientated problems and of managing teams implementing database software is essential.

Communications Specialists — neg. c£17,500

Task assignments will be in the areas of networking, software design, requirements studies involving packet switching etc. Candidates with between four and eight years experience would be ideal for these positions.
Full relocation expenses will be paid, and unusually thorough efforts are made to ensure that the move is carried out as smoothly as possible especially where a family is concerned. Contact: Andy Wright.

MVS Systems Installation

Amsterdam — £ neg (v. high)
An ideal opportunity for an individual with a thorough background in IBM Systems Programming and Software to take on a major consultancy role. Obviously, a deep knowledge of MVS is required - and interview could be arranged in Holland extremely swiftly for the right candidate.
This is essentially a permanent position but a fixed term contract is also an option
Contact: Andy Wright.

Head of Development and Support

West End — £9,000 + mortgage
We have been retained by an overseas bank to appoint this senior position, which entails complete management responsibilities for all d.p. activities (excluding operations). The company are currently upgrading their IBM 370 machine and the fairly small existing team will be increased. The initial activities of the appointee will involve re-vamping the overall standards, reviewing the parameters of the various staff positions and ensuring efficient, smooth transfer to the bigger machine.
Applicants should be mature and experienced in management, having maintained close contact with the technical aspects of commercial d.p.
A banking background and/or awareness of SWIFT, etc., is desirable.
An early commencement date would be a real asset. Contact: Mike Creamer.

Programmers & Analysts (INSURANCE COMPANY)

Hampshire — up to £7,900 + mortgage subsidy + benefits
One of the most prestigious insurance services companies in the UK with an impressive 40% growth factor last year, are recruiting additional staff for development work. Many systems are under way including installation of a DMS 2 database and a large real-time terminal network. Completion of these projects opens the way for a considerable number of additional systems thus ensuring creative work for the future.
Programmers must have at least 18 months COBOL experience in a batch or real-time environment. Analysts should have real-time commercial or accounting applications experience preferably at a Senior project level.
First class location, outstanding employment package and a realistic career growth. Call for more details Contact: Mike Creamer

Systems Analyst

South Midlands — c£7,500
We have been retained by a large international manufacturing group to recruit a Systems Analyst to design and develop commercial applications. Candidates must have a minimum of five years d.p. experience and have been involved in the design and implementation of at least one system from start to finish.
A background of manufacturing and accounting applications would be ideal.
Salaries are negotiable according to experience. Large company benefits including relocation assistance where appropriate Contact: Jim Baker.

For further information on any of the above vacancies, please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.
JAMES BAKER ASSOCIATES, International Personnel Consultants,
16 Maddox Street, London W.1. Tel: 01-491 4478

SDI

ARE YOU FRUSTRATED IN YOUR CURRENT POSITION?
JOB SATISFACTION?
REMUNERATION?
LACK OF ADVANCEMENT?

THIS COULD BE JUST WHAT YOU'RE LOOKING FOR

SDI, the largest independent DOS, DOS/VS and soon DOS/VSE systems software company in the world has just formed a new group at its Development Centre near High Wycombe (Bucks), to provide Technical Services to the world-wide marketing organisation as well as internally to the Development teams.

If your current job does not offer you the satisfaction and challenges you desire then read on to see if you are the sort of person required for this new team.

The positions available are varied and will at times involve visits to customers in all countries in which SDI operates, as well as the provision of technical services to marketing companies and internally to the Development Centre. Initially, there are three positions available:

1. Technical Administrative Officer: who will provide technical and marketing assistance to the world-wide marketing organisation, as well as the creation and administration of various internal training schemes and procedures.
2. Product Assurance Controller: who will provide a new improved level of quality control procedures, external to the Development teams' current high standard.
3. Applications Programmer: who will design, document and write applications suites for internal use.

Successful candidates will also have the opportunity to qualify as Product Specialists and thereby be involved in the launch of new products and features world-wide.
You will have the opportunity of joining a dedicated group of professionals who are currently working towards filling the gaps left by IBM's recent 4300 series announcement.
The remuneration package offered consists of:

- Above average salary
- A brand new building offering an excellent working environment
- Relocation assistance where necessary
- Life and disability insurance schemes
- Pension scheme
- Unlimited career growth opportunities

If you possess some or all of the following skills and abilities:

- Are a bright self-starting individual able to get on with the job with minimum reference to superiors.
- Consider yourself to have an excellent understanding of DOS/VS.
- Have had some system programming experience.
- Have had some applications programming experience.
- Consider yourself to have an excellent understanding of System/370.
- Have had some experience with GRASP or GRASPVS (desirable but not a prerequisite).
- Have had some operating experience (also desirable but not a prerequisite).

then why not give Robin Bailey a call on High Wycombe (0494) 20947 between 09.00 and 17.30 weekdays, to find out more, or write to:
SDI, PO Box 84, High Wycombe, Bucks.

HONEYWELL NEW RANGE LEVEL 64 D.P.S.

ANALYST PROGRAMMER TODAY? SYSTEMS & PROGRAMMING MANAGER TOMORROW?

West London — **£8000**

Yes, and the opportunity of taking over a NEW RANGE Honeywell Level 64 installation which will replace the existing hardware. The new machine will support an on-line network linking 22 branches, and other group companies.

The successful applicant will ultimately have responsibility for this D.P. department and will report directly to the D.P. Group Services Manager. Experience should include a strong systems and programming background having been involved on a Honeywell level 64 project from the early development stages preferably through to implementation.

An excellent salary package is available; with the added attraction of probable appointment as the Data Processing Manager, after the initial installation.

Phone Bobbie McCormick on 01-603 7335.

IPP Information Processing People

NORTON

Norton GmbH in Germany, an affiliate of Norton Company, Worcester, USA, is looking for an

ANALYST/ PROGRAMMER £10,000 p.a.

Norton as a major industrial supplier has plants in 27 countries worldwide.

In Germany we are based in the area of Cologne/ Bonn.

The successful applicant will need a minimum of 2 years' experience of Cobol and a knowledge of analysis and implementation of commercial computer systems.

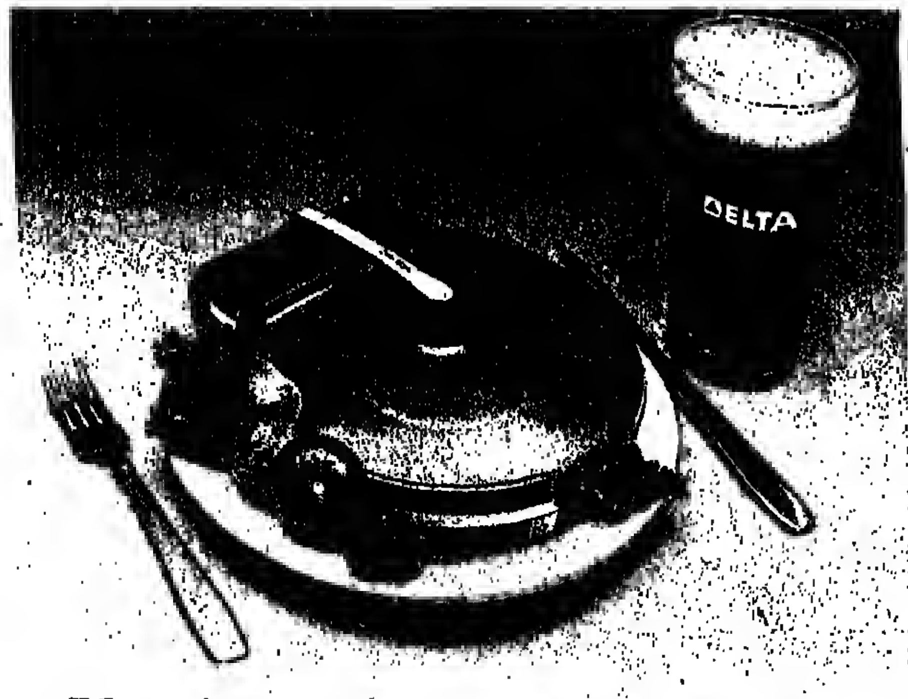
The person appointed will also be willing to learn German.

The salary range is around £10,000 p.a. with excellent prospects as well as other fringe benefits.

Relocation expenses will be paid by the company.

Kindly send your application, including a full c.v., to:

NORTON GmbH
C/o Mr. H. G. Kunz
Postfach 100
5047 Wesseling
West Germany



If you've an appetite for production control-we're about to whet it!

Systems Analyst- Birmingham

We at DELTA realise that our success depends largely on people, and this new opportunity has been created by the promotion of someone to a management post in another Division.

You will also find our Building Products Division's installation of two IBM System 3's, model 15D with a substantial teleprocessing network, serves 10 progressive, user companies. They place heavy demands for ever increasing computer usage—yet we keep our DP Department very compact.

Which means we work in small, flexible project groups—with the emphasis on informality.

We are about to institute production control systems. If you are an experienced Systems Analyst, with a sound appreciation of production control, it could be your chance to launch into a long term project where job interest will reach high levels; and to improve your experience and career prospects still further.

Salary will depend largely on experience, but rest assured if you are the person we want, we can attract you. Fringe benefits are those you'd associate with a forward-looking company.

Removal expenses offered if appropriate.

For further information please telephone or write to: Philip Moseley, Divisional Personnel Manager, Delta Building Products Ltd., Argyle Street, Nechells, Birmingham B5 7TW. Tel: (021) 328 0486.

Delta Building Products Limited

DELTA

Systems Design and Development

Major New Hardware Investment

West of London **European Travel**

Our client is the European division of a successful manufacturing company. Currently they are involved in substantial hardware investment, complemented by extensive new systems development to exploit the potential of their planned computer complex. When complete, they will have an integrated European network of distributed processing. Conceptually the approach is unusual and forward-thinking. This development is centred in a pleasant semi-rural location about 40 miles west of London.

They now wish to add a Project Leader and two Systems Analysts to their development team. Working in a highly professional environment, the successful individuals will be involved initially on aspects of complex sales and inventory systems, to be implemented throughout Europe.

Project Leader — package to £8000

Ideal candidates will be graduates with at least four years analysis experience gained in a successful large company. Strong exposure to modern management techniques is essential together with an appreciation of programming, although formal training in this area is not a requirement. Project control experience is desirable, together with the ability to lead a small group of ambitious, enthusiastic individuals.

Systems Analyst — to £6000

Candidates should be on the same career path as described in the requirements above, but at an earlier stage. The quality of the experience you have received will be of far greater importance than the quantity. Ambition and dedication together with an open-minded approach to problem solving, are essential qualities required.

These positions represent excellent 'ground floor' opportunities to play significant roles in one of Europe's most advanced data processing complexes, whilst perhaps enhancing your personal quality of life in an area renowned for good housing, schools and recreational facilities. Because of the nature of these positions requiring frequent contact with users at all levels throughout Europe, successful candidates can expect several short European trips per year.

The company has a policy of commitment to training, and suitable courses will be provided, both internally and externally. The benefits package is in line with a major international company and includes relocation assistance where appropriate.

To apply, or for further information, please contact Peter Williamson quoting Reference 1949. Either telephone or write to the address below or telephone his home number, Gravesend (0474) 50342 between 8 and 10pm in the evening or at the weekend.

Lloyd Chapman Associates
123, New Bond Street London W1Y 0HR 01-408 1670

INSTITUTE OF EDUCATION
(UNIVERSITY OF LONDON)

PROGRAMMER A

Applications are invited for the above post in the Department of Statistics and Computing. The successful applicant will join a senior programmer and an operator responsible for providing computing services within the Institute. The work involves the provision of help and advice to research staff and students using statistical packages or writing their own programs, usually in Fortran, and helping with the day-to-day running of the remote-job-entry terminal which links the Institute with all the major University of London computing centres. Assisting in the running of computer courses for postgraduate students, and developing program libraries will also be required. A good knowledge of Fortran is expected and experience in statistics would be an advantage. The post offers the opportunity to gain wide experience in research computing and would be suitable for a graduate interested in a computing career.

Salary for this post is within the scale £3018-£3657 plus £502 London Allowance.

Further particulars and application forms are obtainable from Personnel, University of London, Institute of Education, Bedford Way, London WC1H 0AL, quoting reference P/SC. The closing date for completed application forms is May 31st, 1979.

PARIS BASED

Computer Programmer, French speaking, for American company on IBM-34, minimum four years experience in RPG 11, Cobol or one other language.

Apply: Technician, 811 High Road, London, N12. Tel. 01-445 0022 (day).

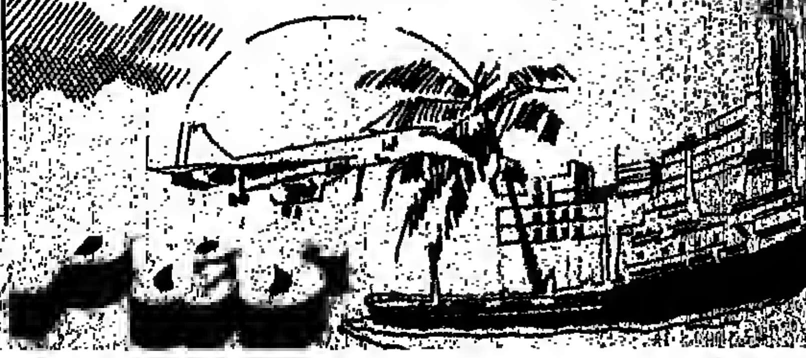
It's all happening in the Middle East

KUWAIT **IBM CICS Assembler**

Our client needs urgently IBM CICS DOS Assembler systems programmers, programmers with CMC experience, IBM Cobol and Assembler programmers and a top flight Project Leader-Systems Programming with PDP 11/70 RSX 11 background.

Extremely attractive packages may be negotiated in keeping with those normally offered for Middle East appointments.

Please apply in the first instance to:
Programming & Systems
9-11, Tatton Street,
Knutsford,
Cheshire, WA16 6AB
Tel: 0565-4925
or, 30 Baker Street,
London, W1M 2DS.



BASIC + PROGRAMMERS
City **to C£7000 + Mortgage**

An International Banking Group require all levels of BASIC+ Programmers to be involved in their new MINI projects.
A minimum of 3 years' experience in BASIC+ is required or, alternatively, good experience in other languages would be considered for people who wish to enter the MINI field.
The Company have several DEC PDP 11 Machines coupled with large IBM Mainframes.
Other attractions include flexi-time, Bonuses, subsidised Mortgages, and loans after 6 months.
Reference HK 20/1

MINI ASSEMBLER PROGRAMMERS
West London **to £7500**

A small but rapidly expanding Software House based in London are currently seeking Assembler Programmers with a commercial background to work in Customer Support role.
If you have around 3 years' Assembler experience on either Mini's or Mainframes and would welcome involvement on a client contact basis then this opening would be of interest.
The Company offers good salary plus paid overtime and the chance to move into Analysis.
01-439 7871 **Reference HK 20/2**

COBOL PROGRAMMERS
City **to C£6000 + Mortgage**

Two financial organisations operating both IBM and ICL installations are seeking programmers with a minimum of 12 months' COBOL who wish to work in a financial environment, in order to expand on their current experience.
Our clients offer excellent good starting salaries, along with extremely good fringe benefits, including CHEAP MORTGAGE, L/V's, season ticket loans etc.
Reference BP 20/4

SYSTEMS ANALYST
C. London **to C£8000 + Bonus**

A large national hardware manufacturer currently require a Systems Analyst with a minimum of 2 years' Analyst to work in their business systems Division.
If you have a good analyst background in a commercial environment with some programming experience will be of interest.
The company also supply software so there are openings in either the hardware or software side and they are increasing all the time.
They offer a competitive salary plus a car allowance and bonus scheme.
01-439 7871 **Reference HK 20/5**

JUNIOR SYSTEMS ANALYST
City **C£6,500 + Mortgage**

A major financial organisation operating an ICL 1900 installation which will be updated to an ICL 2960 by the end of the year, is seeking a junior Systems Analyst who is looking to expand on their current experience.
The minimum requirement is 18 months' systems experience gained on any hardware. A programming background would be useful although not essential.
The Company offers a very good starting salary together with extremely good fringe benefits including a 4 % MORTGAGE, BONUS, FREE LUNCH, season ticket loans, non-contributory pension etc. **Reference BP 20/7**

PL1 OR ASSEMBLER PROGRAMMERS
N. London **to C£7000**

A large manufacturing COMPANY OPERATING AN IBM 370/138 requires a number of programmers to expand their Data Processing department, which is undergoing a major development scheme.
The minimum requirement is twelve months' experience, although the vacancies cover a range of positions and expertise.
The Company offers a very good starting salary together with the usual fringe benefits one would expect of an organisation of this size.
01-439 7871 **Reference BP 20/8**

SYSTEMS DESIGNER – ADDA COMPUTERS
West London **to C£8000**

A new Company operating in the rapidly expanding Micro Market are currently seeking a Systems Designer to take responsibility for development and implementation of their applications Software.

The ideal candidate should be willing to get involved with Systems from feasibility through to implementation. Also required is a knowledge of BASIC on either MINI's or Micros.

The company consider this vacancy to be of utmost importance to their development plans. You would be part of a small team; they intend that the successful applicant will head a systems development team.

Apart from offering an excellent salary this position provides an excellent opportunity to be involved in the rapidly expanding Micro Market.
01-439 7871 **Reference HK 20/3**

CONTRACTS

CTL 80/50	COBOL	S. LONDON
SYSTEM 3	RPG II	HANTS
COBOL	OS/MVS	BERKS
SYSTEM34	RPG II	N. LONDON
BASIC	RSTS/E	N. HANTS
D.G. NOVA	ASSEMBLER	HERTS
MACRO II	RSX II	HERTS
COBOL	IMS	BERKS
BURROUGHS	COBOL	CITY
BASIC + 2	RSTS/E	CITY/S. COAST
CORAL 66	RSXIIM	S. COAST
SYSTEMS/PROGRS.	CICS	W. GERMANY

TOP CONTRACTS TOP RATES

BOB EDWARDS

TELEX 25851 **01.439.1856**

RECRUITMENT CONSULTANT
West End **£6500 to £9000+**

We are looking for people with several distinct qualities to join our team of consultants; people with the desire to make money, with a flair for assessing and communicating with others, and with the drive to succeed by sheer hard work.

In return for these qualities Datascene will offer an ideal opportunity to use current DP knowledge in a varied and fulfilling role, working with both clients and our own consultants on all aspects of recruitment.

If you have experience within either Systems & Programming, or Operations, and would like more information, please call immediately.

01-439 7871 **Reference HK 20/9**

IBM + ICL OPS

IBM 370 DAYS ONLY **£4500**
Operator with 18 mths+ experience including some JCL knowledge, on any IBM Mainframe, required by Company installing new equipment shortly. Preferred age 21+.

IBM 370 OS **£4400**
City based installation requires Operators with 6 mths+ experience for their 370 + 3031 machines. Good career prospects.

IBM 370 DOS **£4500**
Vacancies exist in all areas for Operators with 6 months + experience in a variety of installations offering a wide range of benefits.

ICL 1900 **£4200**
6 mths+ experience on any ICL Mainframe for large bureau. Excellent career prospects include the chance to move into Programming in the future.

ICL 2900 **C£4500**
Financial organisation requires Operators with 6 mths+ 1900 or 2900 experience. Good career path and usual large company benefits.

This is just a small selection of our current vacancies. If you don't see one to suit you, give us a ring anyway, as we always have many others in both London and the home counties, at salaries ranging from £3500—£6500.

OPERATIONS SUPPORT
Sidcup **to £5000**

A large International Organisation based in an easily accessible part of N.W. Kent is currently looking for staff at various levels for their expanding technical support department. A minimum of 1 year's operating or data control experience is required, preferably with some IBM OS JCL knowledge, although this is not essential.

The installation is linked via a Data 100 network to a large 370/158 running under OS/VS1. The technical support department operates a flexitime system and therefore this is an ideal opportunity for operators to move from shift work into an interesting and demanding days only position.

There is a recognised company career path which includes the possibility of moving into programming in the future. Excellent staff benefits include discount on a wide range of products, staff restaurant, and an active sports and social club, one of the amenities being a swimming pool on site.

01-439 7871 **Reference MH 20/6**

OTHER OPS + DATA CONTROL

Burroughs B700 **to £5500**
Central London Installation is looking for a Senior Operator to take control of the Computer room. Burroughs experience is necessary and there is a chance to learn programming.

Honeywell GCOS **£4600**
Minimum of one year's experience for Senior Operator. Prospects include the opportunity to move into Programming.

NCR B4 **£4500**
One year's + experience, preferably using B4, for site upgrading to large criterion.

IBM SYS 3 Data Control **£4000**
1 year to 18 months' experience required for this City based company. Lots of client contact and an unusual day-shift.

ICL 2904 Data Control **£3500**
Knowledge of Operating any ICL Mainframe would be an advantage for this centrally situated company. Flexi-time.

IBM 370 Data Control **£4000**
9 months' experience of OS in a Data Control or Operating environment is required for this company, 12 hour shifts.

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB 01-439 7871

datascene

Datascene International Ltd Telex: 25851
Sceptre House
169-173 Regent Street
London W1R 7FB 01-439 1856

WON 41

Not many employers in this computer

BUT over the last 12 months, Tesco have taken on 41 new experienced computer personnel, while only two have left. And the reasons for this phenomenally successful record are not hard to find.

For a start, Tesco are successful, the fastest growing retail group in the country as well as the biggest. And this success is in many ways directly attributable to its progressive use of computer technology.

At Tesco, we've got the hardware. It's a £6 million installation with the powerful IBM 3032 at its heart and all the latest bolt-on goodies like laser printers and Mass Storage Systems. This magnificent set-up is not treated as some esoteric toy for dilettante programmers to weave data day-dreams on—a way in which these sort of assets can sometimes get misused.

What separates Tesco from most other computer users is the way in which we have developed and are developing our applications. The hardware is this very day processing any of over 1,000 different programmes and presenting the results in terms that management can understand. And that is the most important interface in the whole business.

Naturally these pioneering systems cannot be bought off the shelf. And it is the challenge of developing and using such a variety of programmes that many of our staff find so satisfying. Others, of course, the more ambitious ones, take comfort from the fact that it is Tesco policy to promote from within. When a senior vacancy occurs, we don't immediately rush to the classified columns to look for a replacement: we look first among the ranks of our own analysts and programmers. And usually we find a talent that is ready for development. That is why you see so few Tesco advertisements for senior computer staff.

LOST 2

field today can make a claim like that!

What we are looking for though, this year, is to increase staffing in our Computer Division by 70 – mainly programmers and systems analysts.

Do you fancy working for better than average money, in the pleasant environment of Cheshunt and the Lea Valley? More importantly, do you fancy working for a company that believes in thinking out logically what they want from an application before any work is started, and then make sure it is used profitably? Do you, in fact, want to enjoy the success you've earned while going on to possibly even greater success? If you do, you won't be bothered about the subsidised restaurant, the Country Club membership, the first class pension scheme or even the relocation expenses you may qualify for: you'll just want to be one of the new leaders in computer technology today. We promise you, you'll get the rewards and responsibility your skills demand.

For fuller details of the jobs we're ready to fill now, contact: Fred Rayers, Computer Services Manager, Tesco House, Delamare Road, Cheshunt, Herts EN8 9SL. Tel: Waltham Cross 32222 Ext. 3398.

TESCO
The new Leaders...

Developing Managers

£8,500 + CAR

SOUTH BIRMINGHAM

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To speed our progress, we require the services of

TWO SYSTEMS DEVELOPMENT MANAGERS

to take control of specific projects vital to our growth.

Whilst precise contents of the projects will differ, the overiding requirements of both positions are:

1) **skills in successful man-management**
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3) **strong personality and motivation**

We feel that the status of these positions warrant a minimum of five years systems analysis expertise in either a manufacturing or business environment.

Our development is based upon an increasing involvement with mini computers and experience in this field would be an advantage.

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MARTIN STAINTHORPE ON: 021-236 3781 (24 hour answering service).

Specialist Computer Recruitment Ltd

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OCC

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Senior Systems Analyst

c£7,500

The Bowater Corporation Limited, Knightsbridge, London, S.W.1.

■ Share Registration System

The Senior Systems Anelyst will be responsible for investigeting the current share registretion system, and developing and implementing a new system. It is e major project and will run on the Hewlett Peckard 3000 computer which was installed early lest yeer at the corporete heedquarters, Bowater House. The system may employ detabese and teleprocessing techniques. The Senior Anelyst reports to the DPM end will join a small but effective teem.

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The Company possesses its own POP 11/34 computer which it uses in-house for software development.
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Telephone: 01-629 5932

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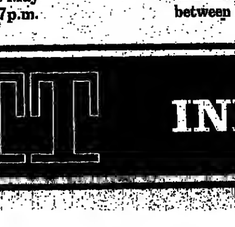

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Come and meet us at:

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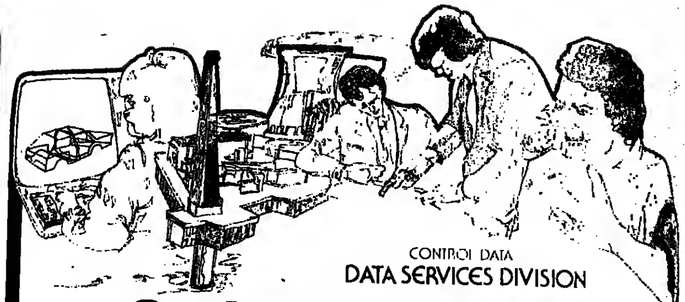
Please send a CV, or a letter listing professional career history to date including hardware and software exposure, current employer, position and salary, or telephone for an application form, in complete confidence, to ANTHONY SPURR, Executive Selection Division, at the address below, quoting G725. Applications from either sex.

BIS Applied Systems Limited
York House, 199 Westminster Bridge Road
London SE1 7UT
Telephone 01-633 0866

BIS Applied Systems



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IBM 3031

Get to the Top . . .
. . . with the Company that is already there!

Control Data is one of the worlds largest Date Services organisations supporting Batch, RJE and Timesharing users with scientific and commercial applications on machines in the UK, Europe and US. In the UK our Data Services Division is based at Barnet in Hertfordshire where we have an IBM 360/65 running under MVT/HASP/TSO and have just installed an IBM 3031 running under MVS/JES2/TSO.

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DPCE is embarked upon a dynamic expansion programme, and needs an energetic and professional Sales/Marketing Manager to join the senior management team and take specific responsibility for generating new business.

The person appointed will:-

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- **Salery - £10,000**
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LEEDS CITY COUNCIL
DEPARTMENT OF ADMINISTRATION

COMPUTER SERVICES

The Council currently operates a large ICL 1904S with a variety of computer terminals including mini-computers and a wide range of computer applications running under the GEORGE 3 operating system. Consideration is being given to the replacement of the ICL 1904S and evaluation of alternative equipment is expected to commence shortly. The following vacancies exist in the Development Branch, which is organised into several project teams.

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T1/5 — UP TO £5073 p.a. (inclusive)

Applicants should have experience of COBOL, PLAN, FIND2, GEORGE 3 or Communications Manager. One programmer is required for the Software Team and four are required for the Application project teams. Commencing salaries will be dependant upon experience and ability, generally as follows:

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c) 18/21 months' programming experience £4246 p.a. (T4)
d) 27/30 months' programming experience £4773 p.a. (T5)

Application forms and further details from Personnel Officer, Department of Administration, Room 305, Civic Hall, Leeds LS1 1UR.
Closing date, 4th June 1979.

LEEDS

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SYSTEMS ANALYSTS Initially to £8½K

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★ **ESSENTIAL** — Programming knowledge.
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OUR CLIENT

is a world-renowned International company with the systems facility very conveniently based in London.

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for joining exist at all levels and career progression is both planned and expected.

BENEFITS

include those normally associated with large International companies, i.e. flexitime, a first-class pension scheme, mortgage assistance, etc.

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The company is a major retailing organisation firmly established in UK and EUROPE and the person appointed can look forward to using modern equipment and techniques in developing a diverse range of systems.

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- ★ Warehousing
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These systems will be developed using on-line facilities, and will enable the successful applicant the opportunity of installing projects from feasibility through to successful implementation.

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Ref. NI/1705

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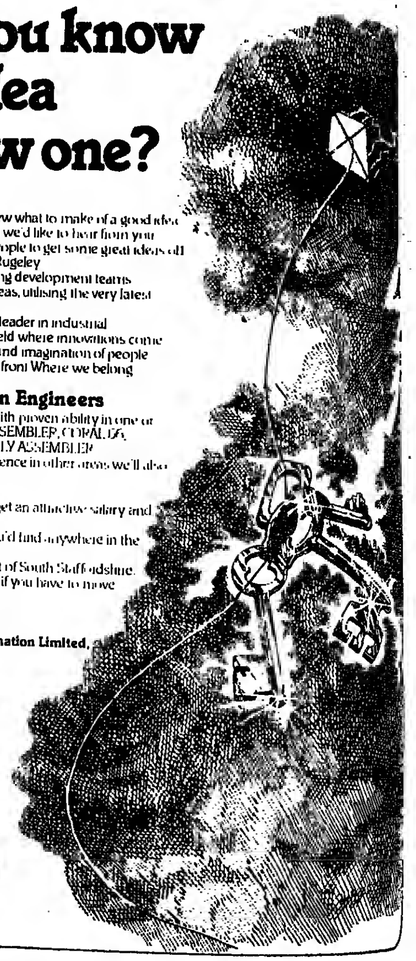
Would you know a good idea if you saw one?



Benjamin Franklin really knew what to make of a good idea when it struck him. If you do too, then we'd like to hear from you.

Because we're looking for people to get some great ideas off the ground at our production unit in Rugeley.

With the help of our expanding development teams we're moving into completely new areas, utilising the very latest in micro-electronics technology.

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We're looking for someone with proven ability in one or more of the following areas. PDP 11 ASSEMBLER, CORAL 66, FORTRAN, RSX 11-M, INTEL 8080 FAMILY ASSEMBLER.

But if you have related experience in other areas we'll also consider you for the job.

With any of these jobs you'll get an attractive salary and good conditions of employment.

Plus prospects as good as you'd find anywhere in the industry.

We're based in a pleasant part of South Staffordshire. The housing is reasonably priced. And if you have to move we'll really help with the expense.

So why not contact:
The Personnel Officer, Thorn Automation Limited, PO Box 4, Rugeley, Staffordshire. Tel: Rugeley 5151.

It could be the best idea you've had in ages.

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Applications are welcome from both men and women.

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UK to £300 per week

ICL	To 2960 Conversion	Brighton	2 months
IBM	Valuation S/A	S. Coast	6 months
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SINGER	Syst. 10 Assembler	Brussels	6 months
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Ring Irene on 01-995 4148 for more vacancies

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CW20/1

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You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.
CW20/2 TRICIA.

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CW20/3 MICHAEL

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CW20/11 TRICIA

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LONDON AND HOME COUNTIES

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CW20/8 TRICIA

UCA Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED
01-995 3883 (01-958 6138 Evenings)
Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4.

Manufacturing Systems in Wolverhampton

£4500 to £6500

(Index Linked)

Experienced Systems Analysts and Programmers are required to work on a variety of systems based on OMAC using an ICL 2960.

The Company, which is part of the internationally renowned Chubb Group, employs 2000 people and is the European leader in its specialist precision engineering field.

Attractive terms of employment are offered to suitable male and female applicants, who should telephone or write to:

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CHUBB

TEESSIDE POLYTECHNIC
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Programmer/ Analyst (Library Systems)

£3430-£4781 per annum plus £312 supplement (NJC Scales AP3-5).

The Computing Centre provides a Computer service for the teaching, research and administrative work of the whole Polytechnic. It is equipped with a powerful Univac 1110 machine recently installed offering excellent batch and interactive facilities.

Applications are invited for the above post, concerned primarily with assisting Polytechnic* Library staff to develop automated cataloguing and issue systems.

Candidates should possess a degree or similar level qualification in a suitable subject. COBOL programming ability is essential and experience of systems analysis or library systems would be advantageous.

Application forms and further particulars from The Registrar, Teesside Polytechnic, Borough Road, Middlesbrough, Cleveland TS1 3BA, to whom they should be returned within 14 days of the appearance of this advertisement.

SITUATIONS WANTED

PROJECT MANAGER/ BUSINESS ANALYST

10 years' experience in computer systems in various industries; commercial and financial systems), and implementation; fluent English/German, now resident near Vienna, seeks challenging new appointment in W. Europe. Box 1051, Computer Weekly.

National Payroll Systems Co-ordinator

£6487 p.a.-£7752 p.a., with possible progression to £8412 p.a.

(salary under review w.e.f. 1.5.79)

Applications are invited for the above post in the Regional Financial Controller's Department, based at Beckwith Knowle, Harrogate. The person appointed will be directly responsible to the Assistant Regional Financial Controller (Income and Payments). In his capacity as Technical Officer, for the maintenance and development of the existing Payroll and Personnel Records and Statistics Scheme and the preparation and implementation of a revised scheme for which the Region has special responsibilities.

This post demands a high level of expertise and knowledge in the field of computer based payroll systems and the possession of a suitable accountancy qualification would be an advantage.

The duties will include:

1. Preparation of all user specifications related to system changes in the current scheme and the design of the revised scheme.
2. Responsibility for advising users of changes, modifications etc. to both the existing and revised schemes including provision of the necessary documentation.
3. Direct liaison with the computing function and with the main users of personnel, accounting and other associated areas.
4. Co-ordinating all meetings and preparation of all progress reports on the project.
5. Assisting the Technical Officer in the general development, implementation and operational running of the revised scheme and
6. In relation to that scheme to set up and co-ordinate the means to communicate the systems and procedures which have been developed.

Applicants should, therefore, have the necessary experience and background to meet the demands of this post and be able to communicate successfully at all levels.

We offer excellent conditions of employment and an attractive location. Relocation assistance may be available.

Full details of age, qualifications, experience and salary should be sent to the Regional Personnel Manager, Central Electricity Generating Board, North Eastern Region, Beckwith Knowle, Otley Road, Harrogate, HG3 1PS to arrive not later than Tuesday 29 May 1979.

It is anticipated that interviews will be held on Thursday 7 June 1979.

Please quote reference SVN/218/EW.

Central Electricity Generating Board, General Development and Construction Division

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PROGRAMMERS

£6,000

Fortran-Prime 300 Mini Computers. Duties include liaison with computer users, and maintenance of Software or Hardware Systems. The successful applicant possessing a scientific degree or HND in computer studies and at least 2 years' computing experience.

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Holders of BSc and HND Civil Engineering with computer programming experience, are required to assist in the implementation of computer systems. Advising Engineers on the selection and use of computer programs to solve engineering problems.

For further details telephone Lindsey Lee, 01-637 0781

ATA SELECTION

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There's a rewarding life waiting for you in Europe

Due to the expansion of our European operations, we need a number of hardware and software TSE's to join our fast-growing Frankfurt-based team.

Hardware TSE qualifications:

Minimum 2/3 years experience in large and/or small systems. You will be supporting our European software training programmes. Fluency in one or more languages would be an advantage, however language training will be given where required.

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You must have experience in operating systems in large computers or with mini's. Ideal position for systems analysts or operating systems engineers. Languages not required.

This is one of the most attractive career opportunities we've ever offered to Support Engineers both in terms of career opportunity and lifestyle. Training will be in the States. We will pay all re-location expenses for you and your family. To give your family every opportunity to fit into the local community we will arrange and pay for German lessons for you and your wife. Obviously finding the right accommodation is vital as we look upon these as long-term appointments. Consequently we will pay your expenses to look for suitable accommodation once contracts are signed.

The salary is around 4,000DM per month with an extra bonus month's salary each year.

If you'd like a more rewarding life for both you and your family, get in touch. Contact Janet Field at the address below or telephone her on 01-572 7455.

Data General
(Data General) Limited, 3rd & 4th Floor, Hounslow House, 724/734 London Road, Hounslow, Middlesex TW3 1PD. Tel: 01-572 7455.

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Two Operators with good OS knowledge are needed for Central London site. Good shift system worked with midweek rest days

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ICL 1900 — £4800c
Operators are required for this site in C. London, 1 yrs. + GII/GIII experience required, good perks.

ICL 1900 — £3800c
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DEC PDP 11 — £5000
Company in City are looking for a senior operator with 2 yrs. + experience with DEC equipment. Some technical background would be an advantage. Two shifts only.

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Surrey site is recruiting operators at all levels. Applications will be considered with other mainframe experience.

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Senior-operators with 2 yrs. + experience in DEC equipment are invited to apply for this position offered by a site in C. London. Perks include BUPA and subsidised meals

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Salary c£4,500 per annum. Hours 9 a.m. to 5.30 p.m. Monday to Friday. Excellent working conditions in our modern building; subsidised restaurant, staff bus service, car park, social club, 4 weeks' holiday, free Life Assurance and contributory pension scheme.

For further details please phone: Mike Elliott (DP Manager) on 01-965 7733 ext. 316 or write for an application form from:

Mr. Ian Sinké, Personnel Manager
VISNEWS LIMITED
Cumberland Avenue, London NW10 7EH

SYSTEMS ANALYST to £8,500

Req'd by a well known Co. offering many benefits. Must have a degree in Computer Sciences or Physics to work in the systems office on a range of system problems covering electronics and performance prediction. W. SURREY

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A progressive co. offering excellent career prospects require a Programmer with a degree in Electronic Eng. with microprocessor exp. W. SURREY

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Manfg. co. with IBM mainframe installation are seeking people with 2 yrs. exp. for systems position. PLI or RPG exp. is required for the trainee post. pref. gained in a manfg. industry. BUCKS

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Min. 2 yrs. exp. with hardware 2904 & 1904A working under Geo. II+ pref. IBM 370 exp. acceptable 3 shifts 4 wks. hol. Co. pension scheme. Interest free season ticket loan. LV's 15p per day. City & E. London

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Applicants must have exp. of 1-2 concurrent application projects and thorough knowledge of programming using COBOL (RPG. BAL would be an advantage) UXBRIDGE

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Mini or micro processing exp. is essential for small business sytems pref. gained in a manfg. environment.

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To give sales support and prepare systems surveys. Applicants must have at least 2 yrs. exp. with good business system exp. and knowledge of VME B or IOMS. NR HEATHROW

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We have many more vacancies for Programmers at all levels in Surrey, Berkshire, Sussex, Kent, Middx, Essex and London

Please telephone for an application form if interested in one of the above vacancies or for details of vacancies in your area.

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Salary up to £7145

A systems analyst is required to join a small team of analysts and programmers in the Administrative Computer Unit, which is already preparing for on line systems to be implemented after delivery of an ICL 2904/60T and which is currently maintaining an increasing range of batched systems on an ICL 1901A.

A sound knowledge of COBOL and a good background in ICL hardware and software is necessary together with some on line experience.

Further details can be obtained from Mr. M. M. Smith, Senior Assistant Registrar (Data Processing Services), The University of Leeds, Leeds LS2 9JT.

Written applications should be sent to the Registrar, The University of Leeds, Leeds LS2 9JT, quoting reference number 1 107/18, by no later than 1 June 1979.

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£5,000-£8,000

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Our client is the major multi-national supplier of NETWORK SERVICES, because of the continuing growth within the UK, the central implementation group has additional staffing requirements at all levels. All positions offer:

- ★ Project Participation from Design to Handover
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As they provide continuous training utilising modern educational facilities, reinforced by extensive departmental experience, they are seeking Analyst/Programmers with 18 months' to 4 years' experience with high level languages on any hardware.

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20/1

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£7,000-£7,500 + Relocation

SCOTLAND

Because of promotion, a vacancy has arisen in the compiler group of this mainframe and mini-computer manufacturer. The Scotland-based software group has world-wide responsibility for a significant proportion of the company's range of software products.

The compiler team is engaged on the development of a pascal based language, and the person appointed will take on immediate responsibility for the code generation phase. Clearly, therefore, recent experience with block-structured languages is essential.

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REF. RW 20/2

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With complex real time systems, a somewhat different approach will be required for this role.

My Client can offer a unique opportunity to learn micro based real time systems inside out. The learning curve will be long and continuous, in keeping with the level of knowledge required.

This is a career opening for someone willing to devote a number of years to becoming an expert in their field.

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20/3

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- ★ **Opportunities for commercial programmers to transfer to technically interesting work.**
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- ★ **Offices in North London suburbs (Relocation expenses possible!!)**
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If you are a professional Programmer give me, GEOFF MARSH, a call and let me tell you how to be properly rewarded for your skills.

20/4

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Applications Programmers — Initial salaries to £8,000

Our client is one of the most successful systems companies in the UK, with expertise of the highest calibre contributing to continuous growth and expansion in all areas of computer technology. One of their major growth areas is in the commercial and business systems development field, designing and implementing for applications which usually involve advanced database and on-line techniques.

The management intends to continue offering a wide range of options to their clients, whilst also providing a broadly based technical career to members of staff wishing to develop a thorough background in data processing. Technical expertise is sought in both the mini and mainframe areas. Experience of PDP 11's (RSTS or RSX operating systems) or the ICL 2900 range (under both VME/B or K) would be of particular interest.

Candidates with between three and seven years experience in the industry would be ideal for the positions available, since they would not only be able to contribute immediately to the company's business but will also be able to capitalise more quickly on their experience, to gain higher levels of responsibility and reap real benefits from the excellent career structure within the company.

The usual big company package naturally applies.

Contact: Margaret Stevens,
JAMES BAKER ASSOCIATES,
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Four telephone numbers that could offer a real career and £10,000 per annum

ABU DHABI 456199 — **FRANKFURT 22300**
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We are looking for people:
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Mouncey and Partners offer:
- some of the best salaries in the business (yes, we do actually pay £10,000 per annum)
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Mouncey and Partners is not a large software house/consultancy. We employ approximately 60 people. However our growing business both at home and abroad has created the above career positions.

Start by calling **01-486 7777 and ask for Janet, John or Mel, or drop us a line at 13-14 Cornwall Terrace, Regents Park, London NW1 4QP** (near Baker Street Station). We will make you an offer within 72 hours if there is mutual interest.

MICROSTAR ★★★★★★★★

EXPERIENCED ANALYST AND COBOL PROGRAMMER REQUIRED

Our client is the UK Marketing organisation of a major international group. Within the Guildford head office, the data processing function is well-established into most areas of business activity.
Processing is on a network linked to IBM 3033's in the corporate data centre. Intelligent front-end processors support local and remote offices to provide on-line services in either stand alone or remote batch mode.
Current planning envisages upgrading the terminal processors to provide extensive online data base facilities.

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Experienced Analyst is required to undertake feasibility studies, analysis, design and implementation of systems. It involves supervision of programmer support and liaison with users to maintain and expand current activities. At least 2 years' experience of project development is needed plus knowledge of COBOL programming. Additional experience of Data Base/Communication/Real Time Systems would be an advantage.

SENIOR PROGRAMMER — Salary to £5500

With at least 3 years' experience of COBOL programming and capable of writing program specifications from systems plan. Includes supervision of junior programmers.

This is a challenging environment with the opportunity to participate in the latest development in Distributed Processing.

Write, in the first instance, to Robert G. J. Wood, MA, who is advising personally on this appointment at
Microstar Limited, Hitherbury House
97 Portsmouth Road, Guildford, Surrey GU2 5DL
Telephone Guildford (0483) 33031

★★★★★★★★★★★★★ MICROSTAR

SOFTWARE ENGINEERS

required near **SOUTHAMPTON**

Computer Instrumentation Limited, a growing company based at Chandlers Ford near Southampton, design and manufacture specialist computer systems, associated peripherals and other electronic equipment. Expansion has resulted in the following opportunities for experienced personnel with suitable qualifications.

SOFTWARE DESIGN ENGINEER circa £6,000

To produce software for a range of intelligent computer peripherals. This software will comprise both microprocessor "firmware" and mainframe support packages. Other projects involve designing application software for computer systems for a wide variety of engineering problems. Suitable candidates should have a scientific or engineering background, plus wide experience of computer systems from the microprocessor level up to mini or mainframe computers. Most of the software will be written in CORAL 66 or Assembler, with some FORTRAN work. A qualification in Mathematics or Computing is desirable, although not essential for someone with the right experience.

SOFTWARE MAINTENANCE ENGINEER £6,250 +

The duties of this position will include software installation, some software design and provision of a software maintenance function for the Company's customers. This last duty will involve personally solving customers' software problems, but also setting up procedures within the company for handling software maintenance problems speedily and efficiently and releasing solutions on a general basis. Candidates for this position should have a similar background, experience and qualifications to those detailed above for the design engineer.

Please telephone or write to:

Peter de la Nougerède
Technical Manager
COMPUTER INSTRUMENTATION LIMITED
School Lane, Chandlers Ford, Hampshire
Telephone Chandlers Ford 66321

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Organisation, software and hardware implementation of 8080/85, Z80, 6800, 9900 and Sil-Sites micro-processor families

Further information from:
Registrar (Short Courses A), Cranfield Institute of Technology, Cranfield, Bedford MK43 0AL, Tel. 0234 750111 Ext. 284, or contact the course organiser David Hyndman Ext. 311.

University of Edinburgh
Edinburgh Regional Computing Centre

COMMUNICATIONS PROGRAMMER

Applications are invited for a programmer to join a team working on the development and maintenance of the Centre's communications network. The network includes about 300 terminals, both interactive and batch, and provides connections to the Centre's main computers [illegible] and to the [illegible]. A connection to PSS is planned. The network has been built up over a number of years and includes a variety of hardware, mainly CTL and DEC equipment. The post is graded [illegible]. Application forms and further details may be obtained from the Secretary, University of Edinburgh, Old College, South Bridge, Edinburgh [illegible]. Closing date [illegible]. Please quote reference [illegible].

Do you have?

- An understanding of accounting principles and procedures
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Then we would like to hear from you urgently regarding our vacancies for Customer Service and Development Consultants in order that we can meet our planned growth objectives.
Starting salary **£6500-£8000** according to experience plus a comprehensive package of company benefits.
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Remuneration: We agree that the figure indicated above, whilst being realistic, also served to attract attention. This level of salary is certainly payable to the right people, in fact, exceptional expertise will warrant exceptional salary in excess of £11 000 per annum.

Opportunity: Being a newly-formed company, scope for personal expansion is only limited by personal ability, the company intending to open further British offices in the near future. For this reason, we wish our staff to not only be highly qualified technically, but also to possess a good level of business awareness.

Location: Location of business premises is currently undergoing investigation in both the Maidenhead and Guildford areas.

Travel: The majority of our projects are located within easy commuting distance of our office. However, for those so inclined, we can offer opportunities for travel in Europe, North America and Japan.

Ideally, the people who work with us will meet most of the following criteria:
- Degree in a science subject
- In depth knowledge of DEC hardware and software
- Substantial experience with system design
- Expertise in leading a communications design team
- Serious interest in the microprocessor industry
- Skill in at least two Assembler languages
- Minimum of five years' industry experience
- Consultancy experience

If you feel it is worth discussing our company, call NIALL DUGGAN on (04862)-20261 to arrange an informal meeting.

Paramin (U.K.) Ltd., South Close, Horsell, Woking, Surrey GU21 4TB.

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Reporting to the Computer Services Manager, you will be responsible for the day-to-day Data Preparation, Data Control and Computer operation functions. You should have the ability to adhere to predetermined work schedules and maintain operational efficiency at an optimum level. You will be required to procure the necessary operational statistics for managerial control and also supply security and control systems to the departments under your supervision.

You are at present involved in running a computer operations department and have experience of ICL computers (preferably 2904) and key-to-disc data preparation equipment. It is unlikely you are under 25. Salary will be around £5800 with normal fringe benefits.

PER Professional & Executive Recruitment

To apply phone Karen Miller 041-221 7044 PER, 48 St. Vincent Street, GLASGOW G2 5TS. (Answering Service outside normal hours).

Applications from both men and women are welcome

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Computer Sciences Canada Ltd., a subsidiary of Computer Sciences Corporation, the world's largest independent company in the computer services industry, has career opportunities available for experienced sales representatives.

We're looking for individuals who have a formal academic background in science or business, with at least two years' successful sales experience selling time-sharing, computer services or mini-computer products.

Total compensation will be based on strong salary level, plus high potential commission, offering both income stability and upward growth. In addition to the excellent compensation package, CSC offers an employee benefit package that is above-average.

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Programmers
Competitive salary + car

We have a large dual processor IBM installation and are professional, forward looking, part of the international Laing group, and based at Boreham Wood, Herts. Our opportunities, for support programming on IBM mainframe equipment, will add prospects and a car to your career.

Candidates should have at least three years' sound programming experience including a minimum of 1 year's involvement with COBOL and 6 months' experience of IBM equipment. The ability to work with minimum supervision is essential.

The duties will include the maintenance and modification of a wide variety of batch and on-line systems. Our diverse range of projects may give rise to some involvement in new development activity or alternative equipment such as dispersed mini- and micro-computers.

Competitive salaries plus company car, and some assistance, if appropriate, with relocation costs, together with a leading package of benefits including over four weeks' holiday, reflect our desire to attract top-flight personnel for this function. Candidates with lues experience but the potential to qualify for the above rewards at a later time should also apply.

For further details of application form, please write or telephone:
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LAING

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Reading, Birmingham, Manchester

Responsible for the installation of our comprehensive range of equipment and its subsequent on-site performance.

Applicants should have a sound knowledge of data terminal equipment and/or telephone lines together with a basic appreciation of logic circuits.

A company car will be provided and overtime and stand-by allowances will be paid.

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Who will fault find on, and repair, PCBs taken from sophisticated data communications equipment at our Reading and Manchester workshops. Applicants should therefore be experienced in the repair of digital and analogue circuits.

All positions offer attractive salaries, generous leave entitlement and benefits one would expect in a successful Company.

Ring for an application form, or write with personal and career details to: D. J. Kichenside, Personnel Officer, Racal-Milgo Limited, Prospect House, Thorn Street, Reading, Berkshire. Tel: Reading (0734) 595314.

Britain's fastest growing electronics group RACAL

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U.K. Subsidiary of an OEM computer peripheral equipment supplier require an experienced Engineer for the following activities.

1. Design of the new features mainly for sophisticated Printer/Terminals.
2. Modification of standard micro-processor firmware.
3. Changes on keyboards and printing elements for Foreign languages.
4. Application of European safety and interference regulations.

The work will require travel throughout Europe and to the U.S. manufacturing base. The successful applicant should be familiar with design, manufacturing and service problems and have adequate experience with microprocessor based systems, digital and analogue circuits.

A very good salary, four weeks' holiday and excellent Rank Xerox contributory pension scheme are offered.

Applicant please contact:
Petr Benes, Technical Director Europe
DIABLO SYSTEMS LIMITED
Regent House, 20 The Broadway, Woking, Surrey
Tel. Woking 71991

Computer Engineer
Telecommunications

The Midlands Electricity Board is responsible for the supply of electricity to an area of some 6000 square miles and to nearly 2 million customers.

The Board needs a suitably qualified man or women to join the Operations and Telecommunications Section in its Birmingham Area.

This appointment mainly involves working on a computer system for distribution network control and the duties will include preparation, modification, testing and documentation of the software associated with the system.

Applicants should have experience with programs for an on-line control system or alternatively have experience in the operation and control of a power distribution network combined with an interest in computer applications.

Salary will fall within the range £4230 - £8215 p.a.

For candidates who satisfy certain requirements in training and qualifications laid down by the industry, there could be opportunity to progress to a maximum salary of £7230 p.a. Salaries are currently under review.

Excellent conditions of service include – 38 hour week, generous holidays and sick pay schemes, superannuation and free insurance schemes, sports and social facilities and staff restaurant.

Applications by letter from men or women quoting Reference CW stating age, qualifications, full details of experience, present position and salary to Area Manager, Midlands Electricity Board, Birmingham Area, 18 Summer Lane, Birmingham B18 3SA. Closing date for applications 28 May 1979.

M·E·B MIDLANDS ELECTRICITY

Cyngor Sir DYFED County Council

Applications are invited for the following post:

COUNTY TREASURER'S DEPARTMENT

SENIOR COMPUTER PROGRAMMER
(CTD 113) — CARMARTHEN
Grade: APS (£4773-£5073 inclusive of supplement

Applicants for this post should have appropriate training and experience.

A proven record of achievement as a COBOL programmer is essential; a working knowledge of another language and of the George 3 Operating System will be an advantage.

The Council has an ICL 1904S computer with communications links to its District Councils and to various schools.

Application forms, returnable by 31st May, 1979, are available on receipt of a stamped addressed envelope from the Director of Personnel and Management Services, County Hall, Carmarthen.

CANVASSING DIRECTLY OR INDIRECTLY WILL DISQUALIFY.

SOUTHERN CLIMBS!

Bognor Regis / Guildford / Farnborough / Leatherhead / Farnborough / Basingstoke / Worthing	Systems Designer (Micro/Mini)	£7,500
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	Trainee Programmer (ICL New Range)	£ £3,000
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REF: CW/11/79

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HARDWARE TECHNICAL SUPPORT CONSULTANT

UP TO £15,000 P.A. Incl. Fringe Benefits

We are acting for one of the world's leading international companies, specialising in D.P. communications with a reputation being second to none. There are opportunities for you to develop your career within an environment dedicated to the development of teleprocessing, utilising the very latest technological developments and skills. Our clients expect to offer successful candidates the required level of product training.

ANALYST/PROGRAMMER

1. You will be experienced working within a technical support capacity working with a sales force, as well as clients, in a pre and post sales role.
2. The successful candidate is likely to have been actively involved within an IBM based T.P. environment for up to three years and possess a good understanding of Access methods, as well as applications sub-systems and programmable communications controllers.
3. The ability to speak a language other than English is not mandatory, but you are likely to be a good communicator.
4. Those people wishing to broaden their experience within a very progressive and dynamic organisation should apply.

HARDWARE TECHNICAL SUPPORT CONSULTANT

1. Ideally you will have had experience working with major mainframe hardware, with particular emphasis placed upon the utilisation of front end processing equipment within a teleprocessing environment.
2. You will have the ability to act in a systems support role within a marketing environment and be able to accept a high level of responsibility.
3. It is likely that your experience will be technically based with an interest in problem solving and ensuring an acceptable level of hardware systems performance.
4. The ability to work well with user hardware and software support personnel is essential.

WRITE OR TELEPHONE NOW IN ORDER TO MAKE IMMEDIATE ARRANGEMENTS FOR AN INTERVIEW — EITHER IN LONDON OR THE SOUTH

Computer Manager
Information Systems
Manchester, c. £7,500 + car

This is a new appointment within the publishing division of a diversified public group. The company produces a very wide range of childrens literature which is sold to wholesale stationers and major retail accounts throughout the UK. Responsibilities are for controlling and developing current operational systems on a recently installed inter-active mini computer. Present applications include order processing, sales invoicing and stock accounting with proposals for purchase and nominal ledger. As a member of the Management Team, the appointee will play a significant role in ensuring efficient management information systems, liaising fully with all user departments. Suitably experienced candidates must have had a number of years of controlling a large volume of data within an EDP environment. Some experience in programming (RPG II) would be a distinct advantage.

G. Sable, Ref: 29224/CW

Male or female candidates should telephone in confidence for a Personal History Form to:
MANCHESTER: 061-236 8981, *Sun Life House, 3 Charlotte Street, M1 4HB.*

Hoggett Bowers
Executive Selection Consultants
BIRMINGHAM, CARDIFF, GLASGOW, LEEDS, LONDON, MANCHESTER, NEWCASTLE and SHEFFIELD.

PROJECT LEADER
MICROPROCESSOR-BASED OFFICE EQUIPMENT SYSTEMS

Our client, part of a major British Engineering Group is a leader in the highly competitive international office equipment market. A position maintained through a vigorous Home Counties based Research and Development facility. The nucleus of this facility is a small project team formed to implement microprocessors in the next generation of equipment.

A project leader is required to head up the team. Reporting direct to the overall design manager he will be leading high calibre engineers and technicians with hardware and software skills.

The ideal candidate will be a graduate or equivalent in electronics or computing and will have been involved in similar projects through to production. He will also have the ability to interface with other disciplines within the department.

Please telephone or send C.V.s quoting reference CW201.

INTERLEX
MINI/MICRO RECRUITMENT

15 London Road
Southampton SO9 4TA
Telephone 0703 28191
Telex 477687 Youngs G

DUBLIN

COMPUTER OPERATOR
THE IRISH DAIRY BOARD

Invitss applicstion for the above post. The successful candidate should have a minimum of 1½ years' experience on a mainframe computer using discs and magnetic tapes.

The Board utilises a 1903T with a George 3 operating system. While experience in either ICL equipment and/or George 3 would be an advantage it is not essential as training will be provided.

A car and current driving licence are essential.

An attractive salary will be offered and contributory superannuation scheme.

Please write in confidence giving details before Monday, 28th May, 1979 to Nora Cogan, Irish Dairy Board, Ireland House, 150/151 New Bond Street, W1Y 0HD. Telephone (01) 493 2602/5. Telex 27627.

CUSTOMER ENGINEERS
(Start £6,000 + Overtime + 2 Litre Car)

Fabulous opportunity to join a leading manufacturer of a wide range of prestige mini computers and peripherals. Excellent prospects include above average growth (43% increase in turnover plus two new branch offices plus 21 new product launches, all in the last year). Helpful friendly young management.

Basic salary £6,000 plus overtime plus luxurious 2 litre car plus training. If you are ambitious, feel capable of assuming responsibility, why not take that all important step forward — if living in London, Home Counties, Midlands, West or North call us today but hurry.

Ref. EK2014.

AB EXECUTIVE (KINGSTON) LTD. 01-549 6442

SENIOR SYSTEMS ANALYST

International computer company, to take charge of small team responsible for materials production and financial systems in a plant based in Central Scotland.

Please hear more on: 01-493 7272.

PLEASE JUST LISTEN, YOU DO NOT SPEAK.....

ANALYST/ PROGRAMMER
SURREY & LONDON £7000-£8000

Kewill Systems Limited, a management consultancy and computer software house, are currently seeking a systems analyst/programmer with a minimum of four years' experience in the development of applications software and with some experience of small business systems (minis or micros).

The successful candidate will play a leading role in the development of specialised applications packages. Prospects of salary and career advancement are good.

For further details please contact Kevin Overstall, Kewill Systems Limited, 500 Chesham House, 150 Regent Street, London W1R 5FA. Telephone 01-734 5351 (day) or Weybridge (0932) 42444 (evening).

MYRIAD

DP PROFESSIONALS

PASS YOUR KNOWLEDGE TO OTHERS

LECTURERS

SOUTH LONDON **CIRCA £7500**

Our Client, a leading Computer Services Organisation, is seeking additional staff to join their team of DP Professionals primarily in a Lecturing capacity. Experienced Analysts and Programmers with enthusiasm and proven communications skills are required to assist in the training of personnel for both the Public and Private Sectors of Industry, using well established techniques. In addition to lecturing the successful applicants will be required to advise attendees, prepare new course material and generally support our Client's operation.

Applicants should possess skills in at least one of the following areas: Systems Analysis, minicomputers, COBOL, BASIC, PL/1, DOS/VS, Database or On-Line Systems. At least three years in Data Processing is essential and IBM experience would be an advantage.

These are Senior Positions in a highly successful organisation. The company offers a good pension scheme, expenses and salary in keeping with a Senior Position.

Ref. SEI/1705

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 (24 HOURS)

METROPOLITAN BOROUGH OF SEFTON FINANCE DEPARTMENT

Computer Services Division

JUNIOR PROGRAMMERS

AP2/4—£3279/£4632 (Pay award pending)

(inclusive of supplement)

Applications are invited for the above posts from trained Cobol programmers, preferably with knowledge of I.C.L. Software. Although practical experience is desirable, consideration will be given to applicants who have completed HND or other full-time computer courses, or will do so in the near future. Starting salary will be fixed in accordance with experience and qualifications.

A wide range of local government applications are currently based on an I.C.L. 1903T Computer, some on-line inquiry systems are in use and on-line cash receipting equipment is being installed.

National conditions of service for A.P.T. and C. services apply and the Authority operates a 36 hour week.

Applications giving details of age, experience and qualifications together with the names and addresses of two referees should be sent to the Chief Finance Officer, Metropolitan Borough of Sefton, P.O. Box 19, Balliol House, Stanley Precinct, Bootle, Merseyside L20 3NO not later than 23rd May, 1979.

Canvassing will disqualify and applicants must declare whether they are related to any member of the council or senior officer of the Authority.

WILTSHIRE COLLEGES CHIPPENHAM TECHNICAL COLLEGE
Cocklebury Road, Chippenham Wilts SN15 3QD

LECTURER GRADE II IN COMPUTING STATISTICS AND MATHEMATICS

To teach in the Mathematics and its application section of the Department, to play a leading role in the teaching of computing and related topics to GCE, TECH, BEC and short courses to contribute to pastoral care of F/T students. Appropriate working experience is vital. Graduate status, teacher training/teaching experience would be added recommendation. Letters of application by return to The Clerk of the Governors, Cocklebury Road, Chippenham.

USA

Banking/Financial
IBM/OS/COBOL
£20K-£30K

Ring Joanne Stone
01-278 6426 (day)
0865 773839
(eves/weekends)

Business Systems Analysts

New Installation — New Opportunities

North Hampshire — to c.£9,000 + car

Our client, the data processing division of a major UK commercial and industrial group with a turnover approaching £500m, is committed to the long term development of a full range of new applications systems on an on-line distributed processing basis, utilising new minis and mainframes as appropriate to individual user needs.

The successful applicants, who are likely to be aged 25 and above, and possessing a minimum of three years experience in investigating, designing, and developing computerised manufacturing or commercial systems to satisfactorily meet users specific business needs, will be offered excellent starting salaries, large company fringe benefits, appropriate relocation expenses and excellent promotional prospects. Please quote G724.

Other opportunities — £8,000 to £11,000

The client has more opportunities than can be reasonably discussed in a single advertisement, and therefore if you feel you have particular skills or specialism not covered in the above text, our client, would welcome an opportunity of hearing from you. For instance, a person with 5 years solid experience in installing and successfully supporting first time mini computer users and possessing good business knowledge could anticipate a starting salary in the region of £8,000 to £11,000. On the other hand an experienced Analyst/Programmer currently on £6,000 to £7,000, could look to a starting salary of over £8,000 depending on experience. Please quote G724/X.

TO APPLY

Please send a CV, or a ONE PAGE, handwritten (or typed), listing of, name, address, age, marital status, home and office telephone numbers, current salary and employer, employment history, including positions held, applications experience, and relevant hardware and software exposure to date, to ANTHONY SPURR, Executive Selection Division, quoting reference number G724 or G724/X. Applications are invited from either sex, and will be treated in the strictest confidence.

BIS Applied Systems Limited
York House, 199 Westminster Bridge Road
London SE1 7UT
Telephone 01-633 0866

BIS Applied Systems

DUBAI ALUMINIUM COMPANY LIMITED

Programmer/Analyst

Dubai

Dubal is now constructing an industrial complex at Jebel Ali in Dubai, United Arab Emirates, which, by mid-1981, will be producing 135,000 tonnes of primary aluminium per anaum and 25 million gallons of desalinated water per day.

Competent people with relevant experience and a taste for demanding start-up situations are required to establish the company's operations on a sound basis. The first pour of aluminium is scheduled for October, 1979.

An experienced Programmer/Analyst, aged over 25, is required to supervise the analysis, design, programming and installation of applications systems as well as to assist in overall systems planning.

Candidates, of graduate calibre, should have spent at least three years in a data processing environment, including a period as an analyst, and have significant experience of on-line computer systems.

Tax free salary negotiable around 80,000 dirhams (approx. 8 dhs. to £1). This is a career position on married or single status and benefits include free furnished accommodation, car allowance and a provident fund.

Please telephone (01-629 1844 at any time) or write – in confidence – for further information and an application form, to P. A. Sandham ref. FY.8803.

MSL
United Kingdom Australia Belgium Canada France Germany Holland Ireland Italy New Zealand South Africa South America Sweden Switzerland U.S.A.

Management Selection Limited
International Management Consultants
17 Stratton Street London W1X 6DB

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go continental

and make the most of your experience

Proost!

Good food is only one of the bonuses you get working on the continent. High salaries are available now in Belgium backed up by better amenities all round. Make the most of your future, consider these opportunities. One of them could be the break you've been waiting for.

Real-Time programmer-analysts from £14,000
Programmer-analysts with experience of PDP equipment in a Real-Time environment are invited to phone in and find out about the exciting possibilities in Belgium.
Experience of process-control/monitoring or automation systems is an advantage, and particularly if you can demonstrate a thorough knowledge of MACRO II and/or RTL/2.
Ref: DJB/140379

If you have the relevant experience you can join one of our teams in Europe with all the fringe benefits that they enjoy. To take advantage of these great opportunities, call Norma Baxter at 01-953-4066.

Advance - and be recognised

Howard Organisation International Ltd,
Employment Business Section, 8 Elstree Way,
Borehamwood, Herts.

HOWARD

Programmers

LEEDS — based at Limewood Approach, Leeds 14.
£3860/£5210 per annum plus a self-financing productivity payment.

Applications are invited from programmers with at least one year's experience ideally in Cobol.

The successful applicants will join a programming department (about 27 strong) which has an impressive record of producing quality software on time using on-line programming facilities. The work is demanding and stimulating with a wide range of applications under development.

The Board's computer installation comprises a dual ICL System 4.70/4.72 with an extensive communications network and a dual ICL 2972 configuration is scheduled for delivery in early 1980.

Conditions of service are excellent and include:

- ★ 4-6 weeks' holiday
- ★ flexible working hours
- ★ contributory pension scheme
- ★ regular salary adjustments
- ★ subsidised restaurant

Applications, quoting the vacancy number 58/79, should be forwarded to the Secretary, Yorkshire Electricity Board, Scarcroft, Leeds LS14 3HS, to arrive not later than 30 May, 1979.

YEB Yorkshire Electricity Board

AN ACE JOB FOR ACE HARDWARE SALESPERSONS . . .

£12,000 to £15,000 p.a. plus COMPANY CAR

For salesmen with 'get up and go' [illegible] commission earning, plus a chance of fast career development with a young and successful hardware distributor operating from Central London and Reading. Products include LSI 11 and PDP 11 [illegible] and a powerful range of disc drives, magnetic tape units, terminals, printers, communications equipment and special [illegible] enhancements. The range is second to none in price, performance and reliability.

The market is commercial users, software houses, education, government and research establishments allowing the above earnings figure to be easily achieved.

This exciting company are looking for two self-motivated Sales Persons with experience in selling computer hardware. Product training will be given.

If you are in your early to late twenties and want a job where hard and intelligent work brings job satisfaction plus high earnings this is for you.

Telephone or write in confidence to: Quoting reference No. ACE 3754/2

Accord Computer Efficiency LTD

UK Office
Portland House
4 Great Portland Street
London W1N 5AA
Tel 01 637 5001 01 580 3754
Telex 261334 ACE UK

European Office
Sarphatistraat 30
1018GL Amsterdam
Tel 020 264664/264082
Telex 10430 ACE NL

SALES EXECUTIVES

IF YOU HAVE THE EXPERTISE— WE HAVE THE PRODUCTS! SO YOU CAN EXPECT TO EARN IN THE FIRST YEAR c£14,000

Yes, not only do we have a complete range of integrated mainframe and mini computers but also a proven range of packages, combined with excellent professional support to free you to get on with the real job of selling.

Realistic quota objectives, excellent technical and management support together with unlimited prospects of career advancement and comprehensive product training will ensure your success. If you are between 25 and 35 years of age, ambitious with a burning desire to succeed in the mainframe or mini-computer market place.

CONTACT: SIMON LEVER ON: 021-236 3781 (24-hour answering service) OR: **Hagley 4166** (evenings and weekends).

THESE POSITIONS ARE LOCATED THROUGHOUT THE UK

ALL REPLIES WILL BE TREATED IN THE STRICTEST CONFIDENCE

SCR
London 01-935 0671, 3 Mandeville Place, Wigmore Street, London W1M 5LB.
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY.
Manchester 061-833 0427, Blackfriars House, The Parsonage, Manchester M3 2JA.

Specialist Computer Recruitment Ltd

OCC Computer Personnel Ltd., 16 Bedford Row, London WC1R 4EB.

To apply for any of the jobs below, or for further information, please telephone the Consultant concerned during working hours on 01 242 9356 or write to the above address.
If it would be more convenient to telephone in the evening or at weekends, the telephone numbers are: Roger Allington: Berkhamsted (04427) 2293, Neville John: Orpington (66) 52980, Renée Nute: 01-874 6372.

London Software Sales
c £11,000 p.a.

A major UK Software House in West London needs an experienced consultant to sell application packages, software consultancy on mini and micro computers and Turnkey projects.

Candidates may have been selling a service including a package, with an application orientation toward the user market. Alternatively they may have gained marketing experience in a technical consultancy role with a large user, a consultancy or a computer manufacturer.

Ref: 505/CW/Renée Nute.

Systems Controller Warwickshire
c £8,000

An engineering company uses a mini computer for a limited range of commercial applications. New systems e.g. production planning and control are now to be developed, possibly with the mini linked to a larger mainframe in the group. The Systems Controller will be the top DP person and will report to a Senior Manager whilst having close working links with the Group Systems Manager. The position would suit a senior systems person with some experience in a manufacturing environment. Relocation expenses will be paid.

Ref: 753/CW/Neville John.

Northern Europe Systems and Programming Consultants
Salary range £17,000 to £22,000
Permanent or Contract Options
Software and Scientific applications within the Aerospace Industry

Candidates for a wide range of Scientific, Technical and Software Systems are required for long term assignments associated with Space Research projects. Education to degree standard plus at least 3 years total experience including one or more of the following is required:

Simulation	Process Control
Numerical Analysis	Telemetry
Astronomy	A.T.E.
R.F. Propagation	Basic Software
Physics	Interpreters
Telecommunications	R.T. Systems

Programming experience should include Fortran and/or Assembler level languages. Hardware preferences include S.4 or IBM mainframe, CII, HP, Interdata and DEC minis and TI, Intel or similar micro computers. Some requirements are urgent.

Ref: 330/CW/Roger Allington.

Scientific Vacancies
From £5,000 +

London N.11 – FORTRAN programmers to work in support role on mini's. Also on-line system support programmers with mini experience in ASSEMBLER or scientific language. Data-comms desirable.
Ref: 164/CW/Fran Setter.

Borehamwood, Herts – Senior Analyst/Programmer to work on development of micro for real-time system. Work would also include support to users and updating of existing systems – must have mini experience and high-level languages.
Ref: 165/CW/Fran Setter.

Cambridge – Project programmers required to work on planning and implementation of overall job design. FORTRAN experience necessary preferably in engineering applications with considerable graphics content.
Ref: 166/CW/Fran Setter.

Hemel Hempstead, Herts – Product Specialist to support variety of software packages in scientific and technical market. Must have minimum of 3 years software support/programming experience, preferably in FORTRAN, CORAL or ASSEMBLER. Must enjoy communicating and travel.
Ref: 167/CW/Fran Setter.

Member of Computing Services Association

OPERATOR REQUIRED DAYS ONLY

Compact ICL department working on the latest Point of Sales equipment. Minimum of 12 months' experience. Knowledge of 1500s and System 10 desirable, but not essential as training is available.

Salary negotiable according to age and experience.

Tel: Mr. Pollard or Mr. Charalombous on 01-759 7352

Alldors International
Duty Free Shop
Terminal 3, Heathrow Airport

Don't just sit there — Do something!

If you are a programmer or Analyst looking for new opportunities we can help you

Ring Angela Gallagher on 01-836 6775

COMPUTER PERSONNEL INTERNATIONAL

DO YOU EAT COMPUTERS FOR BREAKFAST?

We have a very special job for a very special person.

Computer Applications Research is a fast growing software and system marketing organisation. We need an experienced, brilliant all-rounder to take overall charge of software and technical support.

A starting salary of £12,000 p.a. with considerable prospects for advancement, including the possibility of an eventual directorship for a motivated enterprising person.

Apply in writing to the

**Managing Director
Computer Applications Research
71 Hammersmith Road, London W14**

UNIVERSITY OF PETROLEUM AND MINERALS DHAHRAN — SAUDI ARABIA

University of Petroleum and Minerals, Dhahran, Saudi Arabia, a technical University on East Coast of Saudi Arabia operating IBM 370/158 MVS/TSO/SPF with 3 RJE and 70 interactive Terminals requires qualified staff to fill the following positions open for its Data Processing Centre

1. SENIOR ANALYSTS

Positions are available in both the administrative Data Processing area and Academic Computer service. Require minimum B.S. Degree and five years experience at least three of which in IBM/OS environment. Quality assurance experience preferable.

2. SYSTEMS PROGRAMMERS

Degree plus 4-5 years of experience in IBM/OS systems programming with a minimum of two years in MVS environment.

3. TRAINING SPECIALIST

To be responsible for staff development planning and conduct of DP training programme. Require University degree plus DP training experience.

4. EDUCATIONAL SPECIALIST

Planning development and instruction of DP courses. Require University degree and DP experience, preferably in training.

5. DATA BASE ADMINISTRATOR

To assist in initial experience with use of DBMS and its administration. Require degree and minimum five years DP experience IBM OS environment 2 in DB administration.

University offers minimum regular contract for two years, renewable. Competitive salaries and allowances, free air conditioned and furnished housing if available, otherwise housing allowance in cash for outside living, and repatriation to and from Dhahran each two year tour. Attractive educational assistance grants for school age dependent children of key staff provided. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten and half months duty each year with 45 days paid vacation in addition to official holidays during the year.

Interested candidates should send their applications together with photographs and curriculum vitae including the list of references and personal data such as home and office addresses and telephone contacts, family status and copies of degrees/testimonials to

**University of Petroleum and Minerals
c/o Gabbitas-Thring Services Ltd.
Broughton House
6, 7 & 8 Sackville Street
Piccadilly, London W1X 2BR**

Principal Programmer

**IBM INSTALLATION
South East London** To £7,182

You will be responsible for ensuring standards are maintained for all programming in a project team and be thoroughly conversant with COBOL and ASSEMBLER languages.

New projects scheduled include on-line Financial and Property Information Systems, so a sound knowledge of CICS/DOS/VS would therefore be advantageous. Interactive programming facilities are installed using Quote.

Come and join a progressive organisation, based in modern premises at Catford, consisting of some 60 development and operation staff, utilising IBM 370/138 supported by distributed Olivetti, Plessey and Redifon processors.

We offer good career prospects, a competitive starting salary, optional flexi-time, in excess of five weeks leave and a thoroughly professional D.P. environment. Good public transport facilities and free car parking available.

For further details ring our Systems Manager, Mrs L Harris, on 690 4343, ext. 68, or send full personal and career details to her at Lewisham Town Hall, Catford, London SE6 4RU.

LONDON BOROUGH OF LEWISHAM

Learn about freelancing the EASY WAY... before finding out the hard...

VNG

the facts from...
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Knutsford (0565) 52677
(office hours)
or (0565) 3122

TAKE AN ACE FROM THE TOP OF THE PACK . . .

IBM 370/148 OS/VS1 COBOL
ANALYSTS – PROGRAMMERS OPERATORS
N.W. KENT £5500–£8000

Our client, a leading international company, is looking for experienced DP professionals to join their existing team on a variety of interesting projects. Prospects, salary and benefits are excellent.

IBM 370 COBOL
ANALYSTS SENIOR PROGRAMMERS
HERTS £5500–£8500

We have been requested by a world-wide manufacturing company to aid in the recruitment of a team of DP Professionals. In addition to a generous remuneration package, there are many further attractive benefits.

ICL 1900/2903-4 COBOL
PROGRAMMERS
N.W. KENT £5500+

Our client is based in N.W. Kent and is a major international company involved in many engineering fields. They are looking for DP professionals to enhance their existing teams on many varied and interesting projects.

HONEYWELL 66 COBOL
ANALYSTS – PROGRAMMERS OPERATORS
S. LONDON/SURREY £5500–£8500

Calling good DP Professionals with Honeywell 66 experience. Our client is involved within Financial circles and has requested us to aid in their current teams working on a variety of developing and existing projects.

ICL 1900/2900 GEORGE COBOL
PROGRAMMERS
[illegible] £Neg.

If you are an experienced DP professional with ICL 1900/2900 expertise, enjoy travelling and are looking for a chance to enhance your current experience, then this company is the company for you. With generous remuneration and many attractive benefits, including a CAR.

IBM SYSTEM 32/34 RPG II
PROGRAMMER/ANALYST
MIDDLESEX £6500+

Looking for a challenge? Then this position is just what you MUST be looking for. Our client has a variety of projects in the development, design stages that are just crying out for your expertise and experience.

The above constitutes just a few of our vacancies, we have many, many more, so if you are seriously considering a move, whether it be Permanent or into Freelance, and are interested in any of the above positions or have experience on HONEYWELL 66, IBM 360/370, ICL 1900/2903-4/2950-60-70-80, SYSTEM 4, SYSTEM 32/34, BURROUGHS, UNIVAC, PDPs, etc., whether it be in Programming, Analysis or Operations, do yourself a favour, contact:-
ALLAN BROOKER on 01-637 5001, quoting Reference No. ACE 3754/1.

Accord Computer Efficiency LTD

UK Office
Portland House
4 Great Portland Street
London W1N 5AA
Tel: 01-637 5001 01-580 3754
Telex 261334 ACE UK

European Office
Sarphatistraat 30
1018GL Amsterdam
Tel: 020 264664/264082
Telex 10430 ACE NL

CAPP ASSOCIATES group provides permanent and contract recruitment services to clients and applicants

Wimbledon

Analysts and Analyst/Programmers are required to join the internal consultancy company of this British industrial group. The company's activities include the design and development of advanced and often complex systems, evaluation of software, and advice on the acquisition of computers. Systems are implemented on client companies own hardware or on an in-house computer which provides a time sharing service to smaller companies within the group.

Analysts
Circa £8,000

Junior Analyst/Programmers
Circa £6,500

The job offers a variety of work in a stimulating, professional, friendly environment.

The Analyst will deal directly with client management and play a leading role in all phases of the design, development and implementation of systems. Applicants for this position will be all round professionals motivated to solving the real problems of client management. They will have designed and implemented at least one major system preferably in the area of materials and production management.

The Junior Analyst/Programmer will initially play a supporting role but will be expected to develop quickly into the more senior role. Applicants for this position will be similarly motivated and must have played a significant role in at least one system development.

The company has excellent office accommodation close to Wimbledon Underground and Main Line stations. Car parking is also available.

Assistance with relocation is available where appropriate.

For further details including a group report and datasheet, please telephone (24 hour service) and ask for the Managing Consultant, or write to the address below. If you prefer please telephone Bill Theobald evenings or weekends on 01-656 9428.
Quote Ref. CW 131-9T.

Positions open to male & female applicants.

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES
LONDON AND MANCHESTER
Computing Services Association
01-686 9693
A.M.P. HOUSE, DINGWALL RD, CROYDON CR9 2AU

KNIGHT PROGRAMMING SUPPORT LIMITED

143/144 ROYAL EXCHANGE BUILDINGS MANCHESTER 2

CONTRACTS NORTH & MIDLANDS

[illegible]

Our North West based client requires Mark IV programmers for four to five month contracts.

c£NEG.

GEC 4080

Immediate twelve month contract with our Northern client for the right applicant with GEC 4080 experience in a production control environment.

c£NEG.

[illegible]

CICS/PL1/DOS/VS Programmers required URGENTLY by our client in the Midlands. Various applications — long term projects.

c£NEG.

PDP11 RSX11M/D CORAL 66

Twelve month contracts, immediate start with our client in the North for programmer/designers with experience of process control environment.

c£NEG.

[illegible]

Contracts of varying lengths for Cobol or Assembler programmers. Various projects and applications throughout the North & Midlands.

c£NEG.

ICL FILETAB/FTL6

Programmers [illegible] to Watford.

c£220

PDP11 RSTS/E BASIC PLUS

Basic +2 programmers required by our Midlands client. Manufacturing applications. Contracts six months plus in length.

c£230

IMS/COBOL

Programmers with DB/DC expertise required for development work with our Midlands client. Contracts for six months.

c£230

[illegible]

Contracts throughout the North & Midlands for experienced Honeywell programmers. Various projects.

c£NEG.

FOR DETAILS OF THESE AND OTHER CONTRACTS PLEASE CONTACT JUDY LEES/LYNN BARTON ON 061-833 9341/5 (24 HRS.)

PERMANENT OPPORTUNITIES

PROGRAMMERS CHESHIRE c£5000

Our client requires Cobol and Assembler programmers to work on a new installation. House purchase scheme.

Ref. 1023

PROGRAMMERS LANCS £5200+

A subsidised mortgage is among the benefits offered to successful applicants with IBM/Cobol experience.

Ref. 1139

SYSTEMS ANALYST SCOTLAND c£6500

Working on major additions to existing systems. Data way 8 experience required. Pleasant location.

Ref. 1148.

PROJECT MANAGER NORTH WEST TO £7500

Our client requires a project manager to plan and install new systems. Manufacturing experience, IBM equipment.

Ref. 1143.

SYSTEMS PROGRAMMER LANCS £7000+

Our client requires a systems programmer to work on IBM equipment.. CICS/OS experience an advantage.

Ref. 1150

SYSTEMS ANALYST HULL £6500+

Analyst required to work on IBM equipment. Applications financial, commercial and manufacturing.

Ref. 1131

PROGRAMMER SCOTLAND c£5000

Programmer required to work on new projects linked with North Sea oil developments. PDP/Basic experience.

Ref. 1147.

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Department of Computer Services

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Applications are invited from Graduates for the post of COMPUTER OFFICER in the User Services Group of the Computing Centre, to assist computer users in exploiting the existing computing facilities and later, those of the replacement machine. Applicants are expected to have had several years' computing experience in a similar environment. Knowledge of Fortran and preferably also Algol or Basic, are required, and previous experience in supporting applications Software for general use is desirable.
Salary range: O.R. 1A £4,232-£7,145 or 1B £3,689-£6,108 according to age, qualifications and experience.
Duties to commence 9th July, 1979 or as soon as possible thereafter.
Applications (2 copies), together with the names and addresses of two referees, should be forwarded to the Vice-Principal (Administration) and Registrar, University College, PO Box 78, Cardiff, CF1 1XL, from whom further particulars are available. Closing date 31st May, 1979. Reference 1788.

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intel FIELD APPLICATIONS ENGINEERS

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Further particulars may be obtained from Mrs. P. Vaughan-Smith, The University, Southampton, SO9 5NH, to whom applications should be sent as soon as possible. Please quote reference 1D71/A/CW.

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31st MAY ISSUE

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London Borough of **Waltham Forest**

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SYSTIME

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Department of Systems Science

DEPARTMENTAL COMPUTER MANAGER

The vacancy is for a person (male/female) to manage and co-ordinate the entire range of computing facilities within the department, including minicomputer systems with interactive graphics, on-line process control systems and micro-processors.

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Salary will be on the Scale £4232 to £7146 p.a. plus £502 p.a. London Allowance.

Application forms and additional information can be obtained from the Personnel Officer, The City University, Northampton Square, London EC1V 0HB (Tel. 01-253 4399, ext. 334).

REDIFON PROGRAMMERS

A software company wishes to compile a list of currently active freelance programmers in Southern England.

Reply in confidence to Box 1022, Computer Weekly.

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DEPARTMENT OF MATHEMATICS AND SCIENCE

LECTURER GRADE I in MATHEMATICS and COMPUTING

Applications are invited from suitably qualified candidates for the above post tenable from September 1979. The lecturer is required to teach mathematics for GCE O level and ITL in Engineering courses together with computing for the City and Guilds 747 Certificate. Recent experience in the field of computing is desirable.
Salary scale £[illegible] (plus £159 London Fringe)
Application forms and further details obtainable from the Principal.

INTRODUCTION TO MICROPROCESSORS IN ENGINEERING

A one day course 30th May, 1979

Course fee: £30 inclusive
Enquiries to:
School of Electrical & Electronic Engineering
Thames Polytechnic
Woolwich, London, SE18
Tel. 01-854 2030, Ext. [illegible]

Slough Corporation

FINANCE DEPARTMENT

Computer Manager/ess

£6774-£7491 p.a. Inc.

Applications are invited from persons experienced in a wide range of computer applications and with previous supervisory experience.
The Council currently operates an ICL 1900 series mainframe but the introduction of the next generation of hardware is currently under review. The successful applicant will play a key role in this review as well as creating and implementing a development programme which will take computing at Slough into the 1980s.
We offer excellent conditions of service including a 35-hour week with flexible working hours and 24 days annual leave. Removal expenses and generous resettlement allowances are payable in appropriate cases.
Application forms available from: Personnel Officer, Town Hall, Bath Road, Slough. Tel. Slough 23881 Ext. 403.
Closing date: 1 June, 1979.

THE RANK ORGANISATION PRESENTS

ROBERT POWELL
DAVID WARNER ERIC PORTER KAREN DOTRICE
JOHN MILLS
"THE THIRTY-NINE STEPS" A

SCREENPLAY BY MICHAEL ROBSON BASED ON THE NOVEL BY JOHN BUCHAN
EXECUTIVE PRODUCER JAMES KENELM CLARKE PRODUCED BY GREG SMITH
DIRECTED BY DON SHARP
A GREG SMITH NORFOLK INTERNATIONAL PRODUCTION
Released by RANK FILM DISTRIBUTORS

IMPROVED SALARY SCALES

FOR DOS OPERATORS

Film distribution and exhibition are just two of the many varied activities of the Rank Organisation for which services are provided by the Computer Centre based at Whyteleafe in Surrey.

The Centre operates a one megabyte IBM 370/138, running under DOS/VS and POWER/VS, supporting an expanding TP and RJE network. Resulting from this development of facilities a vacancy has occurred for a

SENIOR or COMPUTER OPERATOR to £6250 incl.

Our clients are willing to consider upwards of 18 months operating experience in an IBM DOS environment coupled with a genuine interest in developing your career in computers; opportunities for progression within this area are significant.

A three shift system is worked from Monday to Friday, and in addition to an excellent salary package, first class benefits are available. These include reduced rates on hotels and holidays, discount on company products such Wharfedale HiFi, Pentax cameras, TV and radios etc., plus 4 weeks holiday, staff restaurant and paid overtime.

NOT THIRTY NINE STEPS, ONLY ONE STEP! If this opportunity is of interest to you — then you need take only one step and that is to contact REX SCOONES at Capp Associates CROYDON office quoting ref: CW 138-9S

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES LONDON AND MANCHESTER
CROYDON

STOP PRESS

Systems Analysts

3 SYSTEMS CONSULTANTS

**C. LONDON
C £7,000 + PROFIT SHARING + CAR**

A small but active software house based in SW London needs 3 systems analysts for the following major applications. The first analyst needs to have ICL 2903/4 or 1900 GII experience of 4 years or more, to work on a major financial application. The second needs to know the 2980 machine as this involves an interesting MIS conversion and upgrade from an existing ICL 1900. The third consultant should have stock or production control experience for an ICL 2900 under VME/B, using TP and IDMS. All three vacancies offer attractive working conditions including 4 week's hols. and 6 months' sick pay. CW 20/20.

SYSTEMS ANALYST

MID-MIDDX. to £7,000

Get totally involved in redesigning, virtually from scratch, all the company's applications for a large Electronics subsidiary of this International organisation. Some of the systems, which will be running on their sophisticated H66 computer, will use the latest DATABASE techniques. With 2 years' or more systems experience (any machine) you will share in the following excellent benefits — removal expenses, flexitime, CPS, 4 weeks' hols. and subsidised canteen serving great food. CW 20/22.

SYSTEMS ANALYST

WELWYN GARDEN CITY to £7,500

An International pharmaceutical organisation with a major investment in the latest IBM DOS/VS CICS DL1 installation requires a systems analyst with a proven record of systems implementation to work on a variety of business systems. Make a real contribution by joining a company with excellent in-house training and offering relocation expenses, CPS, 4 weeks' hols, and free BUPA. CW 20/28

SENIOR SYSTEMS ANALYST

MID-SURREY £8,500

Why not join a company based in a lovely part of Surrey? This major household product manufacturer has a large and sophisticated IBM system and has on order the latest IBM 4341 computer. A senior commercial analyst is needed to work on a range of new sales accounting and on-line order entry systems. Along with relocation expenses, other company benefits include CPS, 4 weeks' hols, annual bonus and active Sports and Social club. CW 20/26.

SYSTEMS ANALYST

MID-MIDDX. to £7,250

Our clients, who are a major garment manufacturer with an advanced IBM 370 DOS/VS installation, require a systems analyst who can contribute experience in the manufacturing or commercial systems area. The company uses screen coding and interactive programming as part of its advanced approach to computing, and a career with them would be highly beneficial. Perks include CPS, 4 weeks' hols., a subsidised canteen and staff purchase scheme. CW. 20/23.

SYSTEMS ANALYSTS

N. LONDON to £7,000

One of the most famous Finance houses in the country using IBM mainframes, is seeking young systems analysts wishing to enlarge their previous 2 years' systems experience and work on a variety of financial, reporting and MIS applications. Being a large but friendly company with first rate offices and facilities they can offer 4 weeks' hols., Non CPS and subsidised canteen. Your particular machine experience is not important, neither is a programming background essential. CW 20/28

SYSTEMS ANALYST

MID-SURREY £6,000

This vacancy is for the above mentioned company with latest IBM 4341 computer on order. The post of systems analyst could suit an analyst programmer who wishes to progress into straight systems design. Here a manufacturing background would be an advantage, with a minimum of 3 years' DP experience. CW 20/28.

JUNIOR AND SENIOR CONSULTANTS

£ NEGOTIABLE CENT. LONDON

Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or DEC latest ranges essential. Excellent fringe benefits and prospects. CW 20/21.

SYSTEMS ANALYST

W. LONDON to £7,000 + CAR

A car manufacturer of world renown wishes to recruit a qualified systems analyst to enhance and develop manufacturing and commercial systems on their IBM and DEC real-time installations. Programming background is an advantage but the major requirement is an ability to see a project through successfully. Company benefits include relocation expenses, flexitime, an excellent subsidised canteen, 4 weeks' hols. and an attractive bonus scheme. CW 20/24.

SYSTEMS ANALYSTS

N. LONDON c£6,500

Our clients, based in N. London, are one of the most successful manufacturing and exporting companies in the UK. Being manufacturing oriented they have a variety of systems on their IBM 370 which incorporate the use of DL/1 and IBM's COPICS. If you are interested in this side of DP and want a job with a future, contact us now. They offer relocation expenses, CPS, 4 weeks' hols. and an annual bonus. CW20/27.

SYSTEMS ANALYSTS

SLOUGH £5,500 to £8,000

Join this growing internal services department of a major household and industrial products organisation. Having the latest ICL 2904 plus Datapoint mini computers, this company can offer a really great future. A manufacturing background would be advantageous, without necessarily having programming experience. Perks include relocation expenses, 4 weeks' hols., CPS, and a subsidised canteen. Full training will be given and promotional prospects are excellent. CW 20/30.

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01-995 3883 (01-958 6138 Evenings)
Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4

Consultants + Systems Analysts

A very prestigious client has several openings in their London, Cheshire and Dutch offices for Consultants and Senior Analysts with 5-9 years experience of either Real-time Mini systems or Data-base/on-line Main-Frame Applications.

Openings exist in both the Commercial and Technical/Scientific divisions, the only pre-requisite being depth-of-experience. Whilst a degree in Computer Science or related subject is an advantage our client is placing greater emphasis on actual achievement.

A very attractive remuneration and benefits package is being offered which together with the prestige of association with this foremost company offers an unparalleled career opportunity.

U.K. salaries will be in the range of £7.5-£12.5K and overseas salaries approximately 60% higher. Interviews will be held in Central London and Cheshire as soon as applications are received.

£7.5-12.5K + CAR

MATRIX

Avon House, 360 Oxford St., London. W1N 9HA. Tel: 01-491 4636 Telex: 28800 Londof G.

LANCHESTER POLYTECHNIC

COMPUTER CENTRE

Due to the expansion of the Computer Centre and in order to prepare for the replacement of the current ICL 1903S computer there are vacancies for:

2 TEAM LEADERS
£6,727-£8,080 OR £5,727-£6,342

3 SENIOR PROGRAMMER/ ADVISERS
£5,232-£5,658 OR £5,727-£6,080

AND

2 PROGRAMMER ADVISERS
£4,248-£5,073

Applicants must have a degree or have a graduate equivalent status in mathematics, computer science or other relevant discipline. Have at least two years' post graduate experience (four years' for the Team Leader posts) of programming in a scientific, technological or commercial field, preferably in a variety of computer languages. Applicants for all the above posts should be full members of a relevant professional organisation. For application form and job specifications please apply in writing enclosing a large stamped addressed envelope to the Personnel Officer, Lanchester Polytechnic, Priory Street, Coventry CV1 5FB returnable by Friday, 8th June, 1979.

For application form and job specifications please apply in writing enclosing a large stamped addressed envelope to the Personnel Officer, Lancaster Polytechnic, Priory Street, Coventry CV1 5FB returnable by Friday 8 June, 1979.

UNIVERSITY OF CAMBRIDGE COMPUTING SERVICE

The University of Computing Service has vacancies for two

COMPUTER ENGINEERS

to join a team responsible for the maintenance of mini-computers and associated peripherals within the University. This is a small team which is being expanded to look after a wider range of systems, and the work is varied and challenging. Relevant qualifications and good experience are essential, since the procedures used go far beyond normal first-line maintenance practices. Appointments will be to offices of Computer Engineer in Grades II or Grade III on salary scales between £3,384 and £5,367 (plus USS benefits). These scales are under review.

Further details may be obtained by telephoning Mr. Barton or Mr. Cox on 0223-52435.

Applications in writing (including a statement of age, qualifications and experience and the names of two referees) should be sent to the Director of the Computing Service, Corn Exchange Street, Cambridge CB2 3QG by the 8th June, 1979.

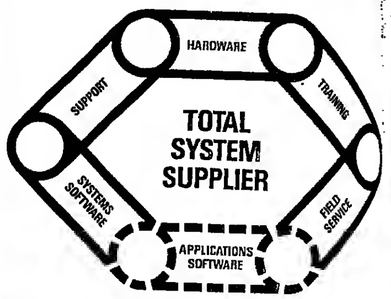
UNIVERSITY OF LIVERPOOL DEPARTMENT OF PHYSICS

GENERAL ASSISTANT

Active and intelligent person, preferably over 30, to assist generally with running Department's computers. Training provided as necessary. Normal hours of work 9.00 a.m. - 5.30 p.m., Monday-Friday. Salary within range to £3,032 p.a.

Application forms may be obtained from The Registrar, The University, P.O. Box 147, Liverpool, L69 3BX to whom they should be returned as soon as possible. Quote ref. RV/597/CW.

A programme for your success in helping us to forge this link £4K-£8K: Hemel Hempstead



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CTL, the fast growing British Computer Systems and Software Company. Expanding rapidly, with another year of record sales. Thanks to customers ranging from commercial and manufacturing organisations to public bodies and government departments.

We aim:
To build on this success by continuing to place emphasis on providing comprehensive systems service to customers, for both hardware and software.

We need:
Programmers with experience of COBOL
Analysts/Programmers
Systems Designers.

You should:
Enjoy working in a project environment that gives total involvement from systems design through to implementation and acceptance.

We offer:
Salary up to £8K (dependent on ability and experience)
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To find out more please telephone Nigel Doe or Nigel Vine – Applications Software Development Group – on Hemel Hempstead (0442) 3212 or alternatively write for an application form to Jim Parle, Personnel Officer, Computer Technology Limited, Enton Road, Hemel Hempstead, Herts HP2 7BD.

CTL

The British Computer Systems and Software Company

Systems Programmer

Addlestone, Surrey

An opportunity exists for a Systems Programmer to join the system support team at our Computer Centre at Addlestone. The work involves research and analysis within the operating system. The Centre provides a 24 hour bureau service to the Company on its ICL 1900 computers running under George 3. The configuration comprises a 384K, 1906S and a 256K, 1906A, also a 2960 running under DMS. RJE, MOP and TP services are provided.

Applicants should be fluent in a major programming language and have systems experience. A knowledge of George 3 would be an advantage.

Large company benefits include a subsidised restaurant and an active Sports and Social Club.

Please write with brief details or telephone for an application form: Peter Bishop, Recruitment Manager, Plessey Radar, Addlestone, Weybridge, Surrey. Weybridge (0932) 47282.

PLESSEY

PROGRAMMERS

Sheffield to £5000

A well known Sheffield company has vacancies for COBOL programmers.

Current projects include major new developments in the areas of manufacturing, order processing and financial systems. On-line and database techniques are in use involving VDU's on both a local and remote basis.

Hardware installed is an IBM 370/148 and an IBM 4341 is on order.

Candidates must have 18 months COBOL experience which can be on any mainframe although previous experience in an IBM environment where CICS is in use would be an advantage for some of the vacancies.

Contact Ivor Norton quoting reference CW/79029.

Ivor Norton Management Services Ltd
Recruitment Consulting Division
52 Shaftesbury Avenue, London W1V 7DE. 01 734 8882 (24 hour answering service)
P.O. Box 83, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 60628

Computer Operators

Up to £5,500 (inc. Shift Allowance)

The Society is seeking applicants in the age group 20-35 years who have gained a minimum of four GCE 'O' level passes including Maths and English Language. The successful applicant will have at least 2 years experience of working in a Computer Operations environment and will form part of a team manning the Society's new UNIVAC 1100/80 series machine installed in its Computer Centre in the Baker Street area of London.

The position will entail shift work for which a substantial allowance is paid. Other benefits include modern catering facilities, contributory pension scheme, BUPA membership, life assurance and special staff mortgage facilities.

For application form please write to:

Faith Wakefield, Senior Personnel Officer, Personnel Department, Abbey National Building Society, Abbey House, Baker Street, London NW1 6XL.

ABBEY NATIONAL

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31st MAY ISSUE

This issue is affected by the Bank Holiday. Copy for this should be sent early to arrive not later than the Friday preceding date of publication. **ONLY** a small amount will be accepted on each Tuesday morning. Your co-operation will be much appreciated.

For further details contact David Abbey
Tel. 01-261 8016
Telex Bianespress London 25137

CONTROL DATA
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Commercial Applications

Analysts & Consultants

Get to the Top..

..with the Company that is already there!

CONTROL DATA is the largest computer services organisation in the world – simple as that! However, we recognise the fact that it takes more than success to attract the best people. That is why we also pay a lot of attention to the training and career development of our employees as well as paying top salaries.

We are currently seeking ANALYSTS and CONSULTANTS with significant experience of commercial applications, preferably related to IBM equipment, to join the commercial applications group within our own PROFESSIONAL SERVICES DIVISION. This team has doubled in size during the past year and opportunities for advancement into management continue to be generated.

Successful candidates will be given opportunities to:–

- Use various Data Management Systems
- Manage projects
- Visit clients
- Work on mini-computers
- Operate as consultants
- Provide sales support
- Work on differing mainframes including IBM3031

Job opportunities now exist in

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and salaries will be commensurate with experience and achievement within the range

£6,000 to £10,000 p.a.

The biggest advancement of your career could be as far away as your telephone.

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Telephone: 01-734 9776.

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UNIVERSITY OF OXFORD
CASE RESEARCH STUDENTSHIP IN COMPUTING SCIENCE

Applications are invited for a research studentship, from students holding or expecting to obtain in 1979 a good honours degree in Physical Science or Mathematics, etc.

The student will work in collaboration with International Computers Ltd., on software development and hardware optimization of an on-line system for the management of large collection of digital pictures. The student will register for a higher degree at Oxford University.

Programming experience is desirable and a knowledge of Computing Science is essential.

The award is subject to the normal rules of eligibility and tenure of the SRC research studentships.

The maintenance grant will be supplemented by a tax free allowance dependent on qualifications and experience.

Applications, including a C.V. and the names of two referees should be sent by 9th June, 1979 to:

Doctor Dennis Shaw, CBE
Radcliffe Science Library
Parks Road, Oxford OX1 3QP

VDU/KEY PUNCH

Data entry experience needed for full/part time job on two year research project.

Starting salary up to £3,442 (FT) under review.

Tel. Miss Hanson, 01-724 2391

LISSON GROVE HEALTH CENTRE
(Lisson) N.W.8

Computer Operators

Up to £5,000 p.a.

We require competent Operators to work on our installation of two 1904Ss and two 2980s, with numerous peripherals including on-line equipment.

To join these teams operating a shift system covering Monday to Saturday (34 hour average four day week) you should be aged over 19 years, with a minimum of 1 years experience on ICL 1900 series or some 2960 experience.

A salary of up to £5,000 p.a. is offered, inclusive of shift allowance.

Benefits include relocation expenses, house purchase scheme, four weeks' annual holiday, non-contributory pension, free life assurance, luncheon vouchers, 24 hour staff restaurant etc.

For further details and an application form telephone Jackie Vope on 01-952 2333, or write to her at:

Bankers' Automated Clearing Services Limited,
3 De Havilland Road,
Edgware, Middlesex.

BACS

JBA

European Technical Support Manager

Amsterdam

The European Marketing Centre of one of the world's leading manufacturers of information display and graphic systems wish to appoint a Technical Support Manager.

The successful candidate will liaise between the marketing centre and subsidiary companies (and distributors), assess all product parameters with respect to market demands and make relative and comparative studies on competitive products. Conventional management responsibilities will form a large part of the job, together with providing assistance and guidance to product support managers, sustaining a highly efficient technical support service and keeping in close contact with all hardware and software technology.

Applicants must have a technical degree (or equivalent) plus over six years software engineering experience with minicomputers and mainframes in systems software and FORTRAN based applications. At least two years direct management experience of a medium sized group in marketing support, software maintenance or project development is sought. English fluency essential and another European language desirable but not mandatory.

Very attractive salary and benefits, including relocation package.

Contact: Mike Creamer
JAMES BAKER ASSOCIATES,
International Personnel Consultants,
16 Maddox Street, London W1.
Telephone: 01-491 4478.

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★ BELONG TO ANY OF THESE DISCIPLINES: MANAGEMENT: SYSTEMS ANALYSIS, APPLICATIONS PROGRAMMING, SOFTWARE SUPPORT; OPERATIONS; O&M; O.R?

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OR WRITE TO US IN CONFIDENCE AT
8A CONEY ST., YORK YO1 1NA

Principal Computer Operator

Philips Research Laboratories require an experienced Operator to join a small team in the Computer Department.

The Department runs a computing service for scientists and engineers involved in many varied areas of research. It is based on two ICL 1904S processors, using a special version of George III which allows both to access the same file store. A DIGICO 1603 front end connects 36 terminals. Later in 1979 an SEL 32 computer system will be installed to do CAD of integrated circuits.

The person chosen will be involved in all usual aspects of operating, and will also be required to assist and deputise for the Chief Computer Operator in organisational and technical matters. Consequently, several years' 1900 and George III experience is essential, together with a technical knowledge of communications equipment. The ability and flexibility to learn about new systems is also needed.

A five-day week is worked, normally 8.45 a.m. to 4.30 p.m. with shift hours (one in two weeks) from 2.00 p.m. to 10.00 p.m. Please apply to Mr M. L. Malpass, Philips Research Laboratories, Cross Oak Lane, Salfords, Redhill, Surrey. Telephone [...] 5544.

PHILIPS Research Laboratories

PHILIPS

The London office of Europe's leading Computer Consultancy needs a

Senior Fortran Programmer

We're ambitious and developing fast in the business of supplying computing answers to daily business problems.

You can share in our dynamic future if you have a minimum of 2 years' Fortran experience in a timesharing environment.

The applications are mainly Financial, using DEC and SIGMA operating systems. You will be responsible for one other programmer and some systems [...] will be involved.

Initial salary up to £5,200 pa

Ring: Madeleine Hennings, 01-242 0747,
GSI Limited,
83 Clerkenwell Road,
London EC1.

gsi

UNIVERSITY OF BRADFORD

Computing Laboratory
Computer Officer Posts

Applications are invited from graduates or professionally qualified persons for two posts in the University's Computing Laboratory which operates a large ICL 1904S installation running under the George 3 Operating System and providing a central service for research and teaching within the University.

COMPUTER OFFICERS

(Ref. CL/CO/CW):

Are required in the Systems/Communications and Application groups. Both posts require programming experience and knowledge of the GEORGE 3 Operating System would be an advantage. Salary on scale £4232 to £7146 p.a.

Application forms and further particulars are available from the Personnel Office, University of Bradford, West Yorkshire BD7 1DP.

PROJECT LEADER

SOUTH EAST LONDON
TO £7551

New projects scheduled to commence shortly are on-line systems for Finance (including Rent Accounting) and Property Information Systems. Other areas under investigation include word-processing and computerised telephone exchange.

Come and join a progressive organisation based in modern premises at Catford, consisting of some 60 development and operations staff utilising IBM 370/[...] supported by distributed Olivetti, Plessey and Redifon Processors. We offer good career prospects, a competitive starting salary, optional flexitime, in excess of five weeks' leave and a thoroughly professional DP environment. Good public transport facilities and free car parking available. For further details ring our Systems Manager, [...] Harris, on 01-690 4343 Ext. 68, or send full personal and career details to her at Lewisham Town Hall, Catford SE6 4RU.

LONDON BOROUGH OF LEWISHAM

INTERNATIONAL AMERICAN BANK

COMPUTER AUDIT

We are a major American Bank, long established in London. Presently we are expanding our activities considerably Worldwide and particularly in Europe.

Large data processing projects are currently being developed and more are planned in London, Europe and the Far East. The equipment is mainly IBM 370 and IBM System 3/32/34.

As a result of this expansion, the International Audit Department wish to recruit a young man or woman, to join the Computer Audit team. The position will suit a self-motivated programmer, in their mid-twenties with at least 2 years' experience of COBOL Programming under DOS/VS (preferably in a banking environment), who wishes to develop their career by moving into the fast expanding field of Computer Auditing.

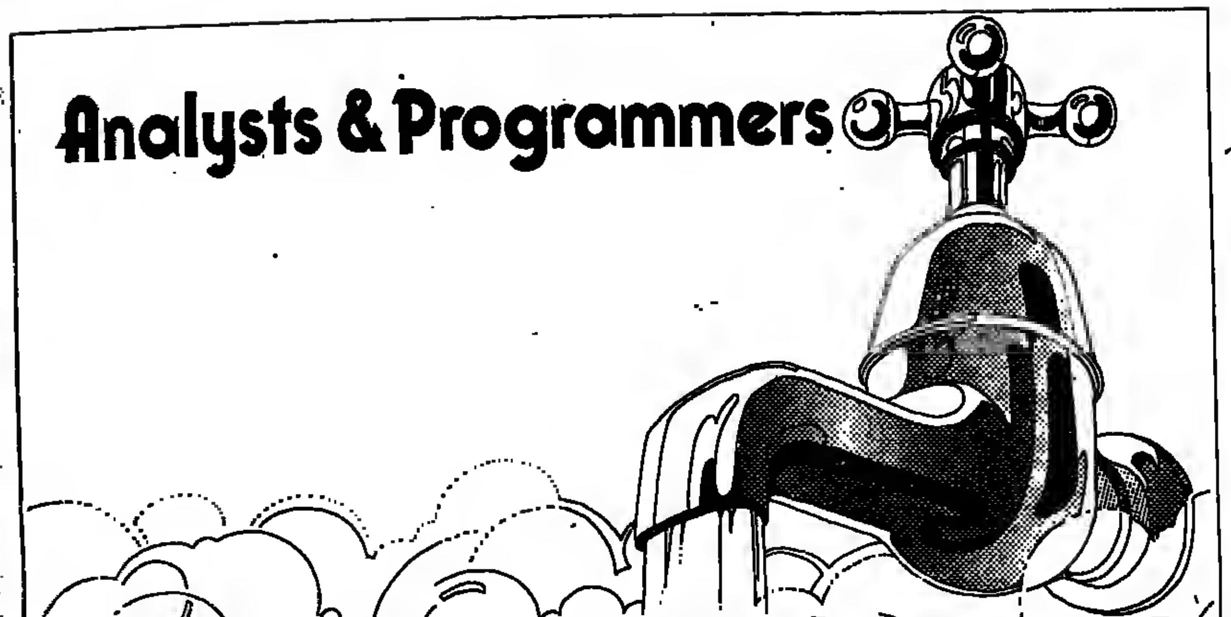
The post affords the opportunity of working with various Computer Systems, both in London and Overseas, and offers excellent training to keep the candidate at the forefront of Computer technology.

Generous fringe benefits include:

- ★ Low interest mortgage and personal loan facilities
- ★ Free lunches, BUPA contribution and life assurance
- ★ Interest-free season ticket loan
- ★ Profit sharing
- ★ Non-contributory pension scheme

For further information please write or telephone Richard Newcombe, Manufacturers Hanover Trust Company, International Audit, 2/3 Cursitor Street, London, EC4P 4BB. Telephone: 01-405 1365.

Analysts & Programmers



Why Britain's biggest process industries need to tap your talent

Turn on a tap . . . fill up with petrol . . . take an aspirin: the chances are you'll be using the end product of Kent process control technology. Kent Automation design, manufacture and market computer-controlled systems to increase accuracy and efficiency in most of our biggest process industries: water and power, oil and metals, chemicals and pharmaceuticals.

As an analyst or programmer with us, you would spend a good deal of time with companies like these – on their premises, both around the UK and overseas. You'd be pitting your wits against the unique and complex problems of software design and application for these large high-technology systems, which are powered by our own ranges using PDP8 and PDP11 minis. Most important, you'd be responsible through literally all stages of the project from system definition to commissioning and beyond.

We're a compact, dynamic company relying for our continued growth and success on the talent and expertise of our computer people. The programmers and analysts we are now looking for will be graduates with at least 2–3 years' experience, including exposure to process control; once with us, they are encouraged to develop very high levels of technical and managerial skill and many will look forward to becoming project leaders or software consultants within 2–3 years.

Salaries are a matter for discussion but will certainly be very competitive, and full benefits include relocation to Hertfordshire. If you're interested, then please contact us:

Wendy Village, Personnel Department,
Kent Automation Systems Limited,
6 Hunting Gate, Hitchin, Herts. Tel: Hitchin (0462) 54801.
A member of the George Kent Group of Companies.

Make the most of your systems design and analysis experience. Pass it on.

As one of the world's top 2 companies in terms of revenue from computers and associated products, we have won a universal reputation for quality and technical excellence.

Maintaining this reputation, in the face of fierce competition and unprecedented growth, is very largely the responsibility of the dedicated men and women who make up the unique team of Instructors at our Head Office.

They compile and control the courses and seminars that ensure that our sales and support personnel are among the most professional in the field. And in return for this considerable responsibility, we not only pay them well above average salaries, we back those salaries with a full range of executive benefits.

We're now looking for someone to join them: someone with the hard-won practical experience and proven track record necessary to teach both basic and advanced systems analysis/design, project control and management, standards, and structuring.

With the added impetus of direct involvement in one of our most rapidly developing areas, your ambition for ever greater responsibility should find all the opportunity it needs for continual progression.

First-hand knowledge of NCR hardware and software would be a distinct advantage but is by no means essential.

Please write, with brief career details, to: Christine Parkinson, NCR Limited, 206 Marylebone Road, London NW1 6LY. Tel: 01-723 7070.

NCR
Complete computer systems

Advanced Mini + Micro Systems Holland

Are you currently working as a Consultant or Analyst/Programmer on technically demanding Mini or Micro computer applications? If so our International client would like to discuss a career opportunity with you which they believe (and we endorse) is extremely attractive from the point of view of job interest, promotional prospects and salary potential.

This client is currently engaged in a broad spectrum of technical applications including design and implementation of Mini and Micro based systems for: process control. Real-time communications, message switching etc. Much of their work is of a pioneering nature and will appeal to those less interested in re-inventing the wheel and more interested in innovation.

A comprehensive package is offered including full relocation expenses, provision of initial accommodation and re-settlement advance. Ideally, you will be either a graduate in Computer Science or other related discipline or have considerable experience in lieu. In any event you will certainly be offered a salary in line with your achievements and potential. Expect to talk in the salary range of:

£10-18K

MATRIX

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SYSTEMS

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Program Spvsr	COBOL/OS	to £7500	Middx.	Ref. A3107
Sen. Programmer	ALGOL	to £1750	E. Anglia	Ref. B2854
Sen. Programmer	RPG II	c £5400 + mort.	City	Ref. A3005
Sen. Programmer	Assmblr/IBM	to £1500	City	Ref. B3140
Sen. Programmer	RPG II	c £5800	N. London	Ref. A3062
Anal/Programmer	COBOL/IBM	c £6500	Surrey	Ref. A3061
Programmer	Assmblr/IBM	c £6500	Herts	Ref. B3143
Programmers	COBOL/DOS	c £5500	Berks	Ref. B3141
Programmer	CASAL	c £0000	Herts	Ref. 02945
Programmer	COBOL/1900	c £10,000	W. Germany	Ref. L3119
Programmer	COBOL/RPG II	c £6000	N. London	Ref. L2837
Programmer	COBOL/2904	£6000+	City	Ref. L3037
Programmer	COBOL/Mini	c £6000	Berks	Ref. L3129
Programmer	PDP/RMS II	c £6000	Berks	Ref. L3076
Sys/Analyst	ICL/2903	c £1000	Middx	Ref. L3134
Anal/Programmer	Some COBOL	c £7000	City	Ref. L2981
Anal/Programmer	COBOL/Assembler	c £6500	Herts	Ref. L3009
Chief Programmer	COBOL/2900	c £6000	S. Coast	Ref. L3046
Project Leader	3/4 yrs design	c £7600 + car	W. London	Ref. 13048

OPERATIONS

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Sen. Operator	90/V01	c. £5000	Essex	Ref. B3109
Ops. All Levels	Any M/C	to £4500	Lancs	Ref. B2014
Shift Leader	DOS/VS	c £5000	Croydon	Ref. B2811
Sen. Operator	OS/VS	c £5000	S. London	Ref. B2804
Sen. Operator	System 3	to £5200	N. London	Ref. 02878
Exp. Operator	OS 3	to £4500	Middx.	Ref. B3105
Ops. Analyst	9R/VS	to £0500	Middx.	Ref. B3030
Sen. Operator	OS/VR	c £4800	Worcs.	Ref. B2987
Sen. Operator	OS/VS	c £0100	Middx.	Ref. B2924
Exp. Operator	R3700/MCP	to £5200	N. London	Ref. L3127
Ops. Controller	2904/JCL	c £4500	Sussex	Ref. L3186
Operator	PDP 11/40	c £4500	Middx	Ref. L3128
Operator	1900/GU	c £4000	City	Ref. L3032
Operator	System 4	c £4400	Sussex	Ref. L2741
Sen. Operator	2900/DME	to £5000	Hampshire	Ref. L2700
Operator	2903/Exec	c £5000	City	Ref. L2987
Operator	1900/GT+	c £4500	W. London	Ref. L2952
Sen. Operator	2904/Exec.	c £0000	Surrey	Ref. L2994
Operator	PDP 11/34	c £4200	Newcastle	Ref. L3102

OTHERS

Jun. Programmer	COBOL	c £3500	Middx	Ref. H0105
Sen. Data Con.	IBM	c £4000	Middx	Ref. H3093
Data Controller	2 yrs ICL	c £0900	S.W.	Ref. H2857
Data Controller	Min. 1 yr exp	to £3750	West End	Ref. H3099
Trainee Operator	O/A Levels	c £0900	O.E.	Ref. H3110
Trainee Prog.	Min. 3 'A's	c £3500	E. London	Ref. H2963
Trainee Operator	2 'A's	to £3220	Victoria	Ref. H3093
Trainee Operator	'O' levels	c. £2600	Surrey	Ref. H2942
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C/L

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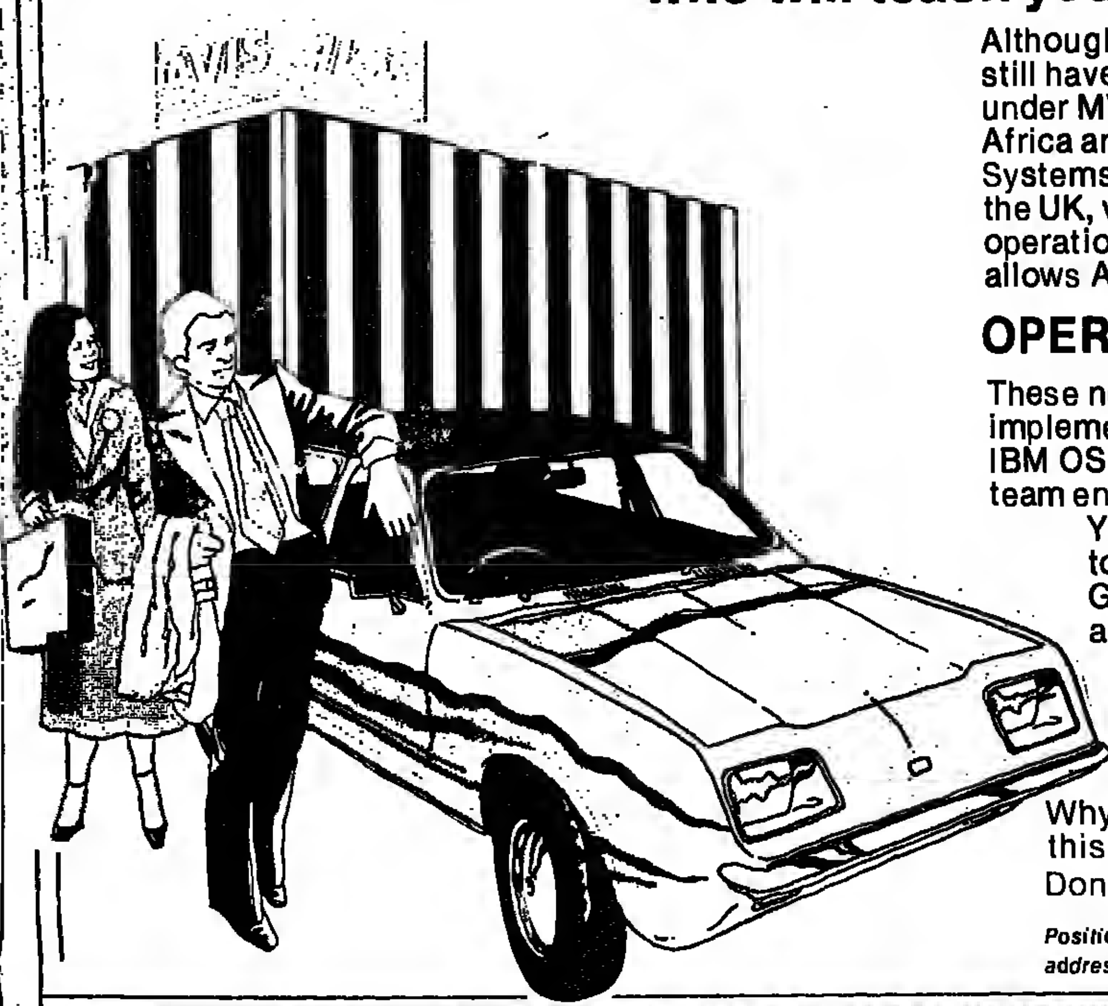

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